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Editorial Open Access

# Operating Room Cost versus Outcome in Elective Colectomy

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## Abstract

**Objectives**: Surgeons and health systems face challenges in achieving healthcare cost containment without compromising patient outcome. This study objective was to correlate operating room costs of elective colectomies with their outcome.

**Design**: Retrospective observational study. Statistical analysis included t-test, ANOVA and Spearman correlation between continuous variables.

**Setting**: Tertiary care medical center.

**Patients**: 114 consecutive patients who underwent an elective colectomy were analyzed collectively and in subgroups by type of operation: Laparoscopic right colectomy, Open right colectomy, Laparoscopic left colectomy, Open left colectomy, Open total colectomy/proctectomy, Laparoscopic converted to open colectomy. Operating room cost was calculated as charges for equipment utilized and personnel cost.

**Main Outcome Measures**: Outcome was expressed as a weighted numerical score for each patient, ranging from 0 to 10. The score took into account hospital length of stay, complications, 30-day readmission and mortality.

**Results**: Colectomy cost ranged from $387 to $8262 (mean=$2176 ± 1244). The mean outcome score was 8.01 ± 2.4 (p=0.091). Operating room cost did not correlate with outcome, collectively or per subgroup.

**Conclusions**: Higher operating room expenditures did not achieve a superior outcome for elective colectomy. This preliminary work may prompt further analyses of resource utilization versus outcome in surgical practice.

**Keywords:** Surgical quality metrics; Colectomy; Surgical outcomes

## Introduction

In the practice environment resulting from healthcare reform, characterized by increased health costs coupled with decreased reimbursement, both hospitals and physicians are facing new challenges in health care delivery with increasing focus on quality indicators [1]. The goal of delivering cost effective care without compromising outcome necessitates monitoring of healthcare expenditures and their impact on clinical outcomes. The delineation of various cost-saving measures and their consequences on patients has yet to be clearly defined. Reimbursement incentives for achieving targets such as reduction in length of stay and readmission rates have been described, but have not provided conclusive results with regard to their impact on patient management among different physicians [2,3]. Studies on the variability of cost in common surgical procedures and its impact on outcome may potentially contribute to determining value in health care, as defined by achievement of high quality of care along with judicious resource utilization.

For example, short-term outcome measures for major abdominal surgical procedures may include rate of complications and readmissions and duration of hospitalization [4,5]. Systematic quantitative assessment of complications and their severity is still not standardized across health care systems [6]. The current absence of a clinical outcomes score weighted by surgical experts has been felt most prominently in light of expanding efforts by the Centers for Medicare and Medicaid Services to reduce hospital costs by targeting hospital performance measures, including readmission rates [7,8]. The integration of a collective grading system to evaluate and compare short-term outcomes of different procedures would likely facilitate a more equitable allocation of resources [9]. Economic evaluation of length of stay, post-operative complications and overall surgical outcome metrics may lead to an inventory of feasible cost containment measures [10].

The objective of this study was to evaluate intraoperative cost differences in a high-volume acute care hospital. As a common and fairly standardized surgical procedure, colectomy was chosen as the operative intervention to analyze. In particular, a major focus of this analysis was to determine whether or not higher operating room costs yielded superior outcome in the postoperative recovery phase.

## Methods

### Data source

This study was approved by the Institutional Review Board. It involved a retrospective analysis of prospectively collected data from the hospital Operating Room Charges database from March 2010 to July 2011. The database described patients who underwent an elective colectomy at the institution. Direct health services costs included operating room costs, by adding operating room time and supplies to charges by increments of time for anesthesia and other services. Professional fees of surgeons were not included in the cost analysis. Additional data was collected as information on patient demographics, disease characteristic, and overall postoperative course variables to be analyzed.

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## Study population

All patients who underwent a colectomy from March 2010 to July 2011 were identified using the procedure label "colectomy". Patients who underwent emergency procedures or other major procedures at the time of colectomy were excluded, due to impact on total operating room time or utilization of additional resources. The study cohort was limited to patients with elective admissions for a colectomy. Patients who received additional minor procedures with no additional incisions (e.g. umbilical hernia repair) at the time of their colectomy were included in the study. A total of 114 consecutive patients were included in the study, 61 males (53.5%) and 53 females (46.5%), ranging in age between 22 and 88 years of age (mean=60.5 years).

Patient group assignment was made according to extent/site of colectomy as well as technique used: Right colectomy - laparoscopic, Right colectomy - open, Left colectomy - laparoscopic, Left colectomy - open, total colectomy/proctectomy - open. Patients who underwent a laparoscopic converted to open colectomy were also identified.

## Mean Outcome Measures

Data on type of surgery, 30-day postoperative morbidity and mortality, length of stay and rates of re-admission and re-operation were obtained. The outcome was expressed as the composite of a novel weighted numerical score for each patient, ranging from 0 (worst) to 10 (best), proposed by the lead author (V. E. Pricolo) (Table 1). A more favorable outcome was directly correlated with a higher score, 10 being the highest possible score. A maximum of 3 points was awarded for best length of stay data, while a maximum of 7 points for absence of any complications. The degree of severity among postoperative complications was stratified from a 0 to 7 point system, with zero indicating mortality (Table 1). If multiple complications occurred, for purposes of analysis, the more severe complication was chosen and the lower score was assigned.

Cost measurements of the elective operative management of each patient included a total operating room case cost, i.e. a composite score of supply cost as well as labor cost.

## Statistical analysis

Univariate and multivariate comparisons were done using the 2-sample *t*-test, ANOVA and Spearman correlation between continuous variables of total operating room cost (in $) versus outcome (0-10 score). For all tests, a $p$ value < 0.05 was considered statistically significant. All statistical analyses were stratified by a two-tier group assignment, which included the laparoscopic and open colectomy groups as well as the further subdivisions of different extent and site of colectomy procedures.

# Results

The distribution of operative procedures, their cost and outcome (expressed as a mean ± standard deviation) and statistical data are reported in Table 2. Operative procedures included 29 laparoscopic right colectomies (25.4%), 21 open right colectomies (18.4%), 10 laparoscopic left colectomies (8.8%), 26 open left colectomies (22.8%), 22 open total colectomies and/or proctectomies (19.3%), and 6 laparoscopic converted to open colectomies (5.3%). For the entire group of patients, operating room costs ranged from $387 to $8262 (mean=2176 ± 1244). The mean total outcome score was 8.01±2.4. Postoperative length of stay for the whole group ranged from 2 to 58 days, with a mean of 7.2 days. A total of 46 patients (40.4%) experienced a complication of any kind. The most common complications were found at a score of 6 and 4 (13/114=11.4%), followed by scores of 5 and 3 (5/114=4.4%). There were 2 deaths (composite score of 0), while a score of 10 was achieved in 37 patients (32.5%). There was a trend toward lower complication rate in comparable site procedures performed laparoscopically rather than open. The complication rate for right colectomies was 20.7% (lap) vs. 28.6% (open), for left colectomies 20% (lap) vs. 61.5% (open). However, the cost trend was higher in laparoscopic than in open procedures: $2165±629 vs. $1318±515 for right colectomies; $2392±484 vs 1970±1060 for left colectomies. Due to limited sample size, no statistical significance was achieved in these correlations. The total readmission rate was 35.9% (41/114), most commonly for abdominal pain (11/114=9.6%), followed by partial small bowel obstruction (3/114=2.6%). The mean readmission length of stay was 4 days. Figure 1 is a scatter gram that provides a visual representation of the lack of positive correlation between higher operating room costs and a more favorable outcome.

**Table I:** Length of stay and Complications.

| | | |
|---|---|---|
| Total Score (a+b) | | |
| a. Length of Stay | ≤4 d | 3 |
| | 5-10 d | 2 |
| | 11-60 d | 1 |
| b. Complications | None | 7 |
| | Ileus; Atelectasis; Arrhythmia | 6 |
| | Minor bleed; UTI | 5 |
| | Wound infection; C difficile; Internal bleed requiring transfusion | 4 |
| | Major cardiac or pulmonary complication | 3 |
| | Wound dehiscence; Deep abscess | 2 |
| | Leak; Sepsis | 1 |
| | Death | 0 |

**Table II:** Operative procedures, their cost and outcome

| Procedure | N | $ Cost ± SD | outcome ± SD | *p* value |
|---|---|---|---|---|
| R - lap | 29 | 2165 ± 629 | 9.03 ± 1.95 | 0.6855 |
| R - open | 21 | 1318 ± 515 | 8.24 ± 2.51 | 0.4194 |
| L - lap | 10 | 2392 ± 484 | 8.70 ± 2.67 | 0.4404 |
| L - open | 26 | 1970 ± 1060 | 7.38 ± 1.83 | 0.0681 |
| Tot col/proct | 22 | 3043 ± 2097 | 6.77 ± 2.65 | 0.4486 |
| Lap to open | 6 | 2585 ± 516 | 8.33 ± 1.75 | 0.5979 |

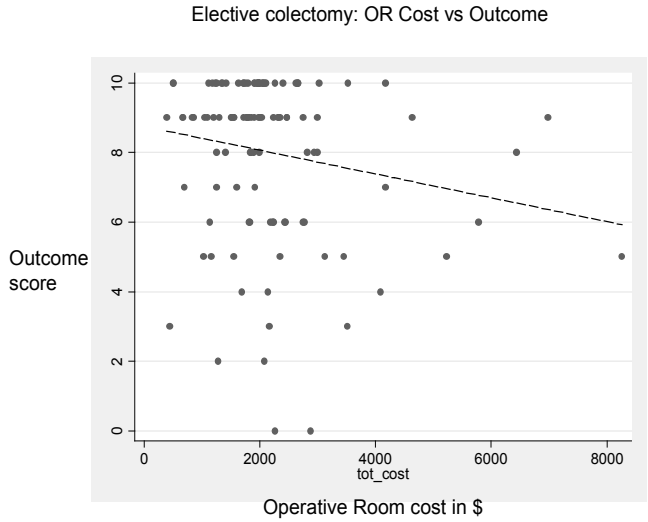


**Figure 1:** Operating room costs versus outcome score for all colectomies.

## Discussion

This study raises several issues. It is intended to direct the attention of the surgical community to the relevance of operating room expenditures that surgeons are largely responsible for, yet not usually even aware of. This study shows that such costs have a very wide range of variability, from as little as $387 to as much as $8,262 for a colectomy. Our data showed a trend toward higher operating room cost in laparoscopic procedures, when compared to same procedures performed by open technique. However, procedures performed laparoscopically had a generally lower complication rate. Nonetheless, both overall and by subgroup, higher operating room expenditures could not be correlated with a superior outcome for an elective colectomy.

The current study has several limitations. The results were obtained from single institutional data, which might not accurately represent other population groups. Consequently, the study sample size is relatively small, which allowed limited statistical analysis by subgroup. Also, the study was not case-matched according to underlying patient co-morbidities [11]. The retrospective design of the study may not be a limitation, in that it prevented any awareness on the part of surgeons that may have led to changes, possibly reduction, in their operating room expenditures (Hawthorne effect).

The main value of this study lies in its timeliness and originality. It proposes a new, simple and reproducible scoring system that may allow outcome comparisons across institutions. It provides a way of tracking performance by institution, by procedure, by division and by surgeon, thereby facilitating data collection, feedback and quality improvement initiatives. It emphasizes the need for monitoring of expenses and its correlation with outcome, by allowing gathering of "value" data specific for each of the above mentioned categories. Such initiatives are likely to provide information that may be very useful to health care systems involved in negotiations for risk contracts with third party payors. This pilot study warrants further research on aggregated outcome scores as well as hospital performance measures, such as financial implications based on type of surgical case mix, especially in view of the implementation of healthcare reform.

Reduction of post-operative complications and length of hospital stay is fast becoming not only a moral imperative, but also an economic mandate, as health care reimbursements are further reduced [12]. The gathering of information that is procedurally-based and accounts for different factors that may affect clinical outcomes can aid cost analyses in surgery and other procedure oriented specialties [13]. Cost-effective surgical procedures may not necessarily equate suboptimal patient outcome, if key areas of safety and efficacy are preserved and possibly even further improved upon.

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### Conflict of interest

Authors have no conflict of interests to declare

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Research Article Open Access

# Long-Term Outcomes of Open Repair of Inflammatory and Atherosclerotic Abdominal Aortic Aneurysms

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## Abstract

**Background:** Abdominal aortic aneurysms (AAA) are a common vascular disease mostly affecting those over the age of 65 years. Open surgical repair (OSR) is considered the gold standard for the treatment of AAA, however long-term mortality and morbidity still remain high in patients with inflammatory AAA, when compared to atherosclerotic AAA. The aim of this study was to evaluate long-term outcomes of both inflammatory and atherosclerotic AAA after OSR.

**Methods:** Out of 837 aortic interventions, 149 patients were identified as having undergone open surgical repair for AAA between 2003 and 2013. Of the 149 patients, histopathological data was available for 92 patients with open AAA repair. Kaplan-Meier curves were analysed to evaluate probability of survival.

**Results:** Patients with inflammatory AAA were younger (70 years) by an average of 2 years compared to atherosclerotic AAA (72 years). Morbidity and length of intensive care stay were insignificantly different in both groups. Inflammatory AAA were associated with higher all cause survival rate (82%) compared to atherosclerotic AAA (68%) (P=0.008) after ten years.

**Conclusion:** There was no difference in clinical outcomes between both atherosclerotic AAA and inflammatory AAA, which is due to the technique used. IAAA were associated with lower mortality rates and improved all cause survival at ten years post open surgical repair.

**Keywords:** Aorta; Aneurysm; Inflammatory; Atherosclerotic; Open repair

## Introduction

Abdominal aortic aneurysms (AAA) usually strike in patients with advanced atherosclerosis [1,2]. The exact cause is poorly understood. General risk factors that predispose AAA development are age, male gender, history of smoking, atherosclerosis, hypertension, chronic obstructive pulmonary disease (COPD), family history and genetic disorders [1,3,4]. The actual causative relationship between atherosclerosis and AAA formation is still undetermined however, a number of studies advocate that atherosclerosis promotes aneurysm formation through mechanical weakening of the aortic wall, with a loss of extra cellular matrix [2,5]. Conversely, other studies have suggested that there may not be a causal relationship between atherosclerosis and aneurysm formation [4]. Previous experimental models have shown that atherosclerosis was found after development of a AAA, suggesting that aneurysm formation preceded atherosclerotic lesion development [6,7].

Inflammatory abdominal aortic aneurysms (IAAA), another subset of AAA, occur in approximately 5 to 10 % of all AAA [8]. When compared with atherosclerotic AAA, IAAA demonstrate abnormalities in serum inflammatory markers [7,8]. IAAA are having a thick, firm, smooth wall that is shiny white in appearance, alongside an increase in wall vascularity with multiple small vessels traversing it. The adjacent dense fibrosis is marked and may involve adjoining tissues and structures [7,9,10-14].

It is well known that open repair is the gold standard for treatment of AAA. Although IAAA are less likely to rupture than atherosclerotic AAA (AAAA), surgical repair of aortic aneurysms is prudent for the treatment of aneurysms to prevent rupture [15-17]. While results of surgical repair have improved, the mortality and morbidity still remain higher for IAAA in comparison to AAAA [9,18].

The purpose of this study was to evaluate and compare long-term outcome between IAAA and AAAA post open surgical repair. The primary endpoint was long-term survival. Secondary endpoints were risk factors associated with both groups, postoperative intensive care unit stay, and postoperative complications.

## Methods

This study was a retrospective review of a prospectively maintained vascular database, at a tertiary referral vascular centre, from 1st January 2001 to 1st July 2013. Institutional ethical committee approval was sought. The committee waivered the need for approval due to the retrospective nature of the study.

All patients admitted with a discharge or post-mortem diagnosis of AAA, with a histopathological report, operative details and computerized tomography (CT) scans during the study period were included in this study. Preoperative information collected for analysis included age, gender, and comorbidities (family history, hypertension, ischemic heart disease, atrial fibrillation, congestive cardiac failure, pulmonary disease, hyperlipidaemia hypercoagulability, diabetes mellitus and smoking; Table I). Comorbidity data, preoperative C - reactive protein (CRP) and erythrocyte sedimentation rate (ESR) were

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**Table I:** Patient demographics and preoperative risk factors.

| | Atherosclerotic AAA (n=80) | Inflammatory AAA (n=12) | *p* value |
|---|---|---|---|
| Gender (% M:F) | 71:29:00 | 67:33:00 | 0.74* |
| Male n (%) | 57 (71%) | 8 (67%) | |
| Mean Age (yrs±SD) | 72 (±34.2) | 70 (±29.7) | 0.83** |
| Family history | 7 | 0 | 0.5* |
| Hypertension | 54 | 9 | 0.03* |
| Ischemic heart disease | 18 | 2 | 1.00* |
| Atrial fibrillation | 6 | 0 | 1.00* |
| Congestive cardiac failure | 5 | 0 | 1.00* |
| Pulmonary disease | 15 | 2 | 1.00* |
| Hyperlipidemia | 51 | 9 | 0.04* |
| Hypercoagulability | 0 | 1 | 0.1* |
| Diabetes mellitus | 8 | 0 | 0.59* |
| Smoking | 50 | 9 | 0.52* |

*$p$ value is Chi-Square; **$p$ value is independent sample t-test

collected to establish risk factors associated with both types of AAA, if any.

Post-operative data collected for analysis included histopathology, major adverse clinical events (MACE), and length of postoperative survival. Cardiac, pulmonary and cerebrovascular events, renal insufficiency, deep vein thrombosis, pulmonary embolism, coagulopathy and bowel ischemia were classified as MACE.

### Categorization

Diagnosis of aneurysm type was made by collectively reviewing the preoperative CT scans, operative findings and histopathological data. The IAAA radiological spot diagnosis is defined as AAA with an inflammatory rim surrounding the aorta on a CT abdomen (Figure 1A, Figure 1B), [18]. IAAA were categorized intraoperatively by thickening of the adventitia due to marked inflammation with or without involvement of adjacent structures, fibrosis and adhesion. AAAA were defined by severe atherosclerosis i.e. atheroma resulting in weakening of the aortic wall on CT (Figure 2A, Figure 2B).

### Surgical technique

A laparotomy and transperitoneal transaortic approach was used in all cases with mid-line incisions. Ligating the left gonadal vein and the descending lumbar tributary of the left renal vein allowed full mobilisation of left renal vein, facilitating exposure of the proximal aortic neck. Both common iliac arteries were exposed, the aorta clamped and sac opened at the left anterolateral aspect.

In case of IAAA, minimal dissection was performed to avoid the phlegm of tissue and enterotomies of the duodenum or jejunum. Dissection around the juxtarenal area was performed to allow the Crawford clamp to slide in vertically, with two multipurpose clamps placed at the level of common iliac artery bifurcation, which is a safer way to avoid iliac vein injury. The IAAA sac was opened at the left postromedial surface in order to utilize the aortic sac as a cushion retractor for the adhered bowel. In the case of AAAA, the left renal vein was divided close to the inferior vena cava, saving the adrenal and gonadal branches. The proximal aortic clamp was placed obliquely in an inter-renal position, preserving blood supply to the highest renal artery. No perfusion shunting was performed [16].

### Tissue sampling

Tissue samples were collected from the anterior aneurysm wall by opening the aneurysm sac with a longitudinal ellipse-shaped full thickness biopsy including intraluminal thrombus (ILT) for histological analysis. Tissue samples were cut in 5 mm segments that were preserved in 4% formaldehyde solution, embedded in paraffin and cut in 4 μm thick sections. Sections were mounted on adhesive Starfrost slides and dried for 48 hours at 37°C, before light microscopy. Routine haematoxylin and eosin staining was performed for nuclei and cytoplasm exposure. Sections were also stained for macrophages, lymphocytes, smooth muscle cell, endothelial cells, elastin fibrin and collagen.

### Statistical analysis

Statistical analysis was used to assess risk factors, and performed using Minitab 16 (Minitab Inc. PA, USA) and SPSS statistical software (SPSS version 20.0, SPSS Inc., IL, USA). Continuous variables were reported as the mean, the median and the range. Missing responses were treated as "no" for specific diseases. All-cause death was estimated using the Kaplan-Meier test. Linear logistic regression models were used for multivariate analysis. Analysis of covariance was used to analyse continuous variables. $p$ values less than 0.05 were considered as statistically significant.

## Results

### Clinical characteristics

Out of 837 aortic interventions, 149 patients were identified who underwent open surgical repair of AAA between 2003 and 2013; of the 149 patients, histopathological data was available for 92 patients with either an infra-, juxta- or supra-renal aortic aneurysms. Both aneurysm types were of similar ages. The mean age of AAAA was 72 years, while IAAA had a mean age of 70 years ($p$=0.23). Men predominated in both aneurysm groups, although the proportion of women tended to be higher in the IAAA group ($p$=0.01).

Mean preoperative CRP and ESR were elevated in both the IAAA (39 mg/L & 31 mm/hr) and AAAA (29.18 mg/L & 23.20 mm/hr) groups. There were insignificant changes in the post-operative CRP and ESR levels ($p$=0.118). Blood cultures were negative in all patients with IAAAs. Mean maximum diameter was 70.1 mm and 80.0 mm for AAAA and IAAA, respectively ($p$=0.196).

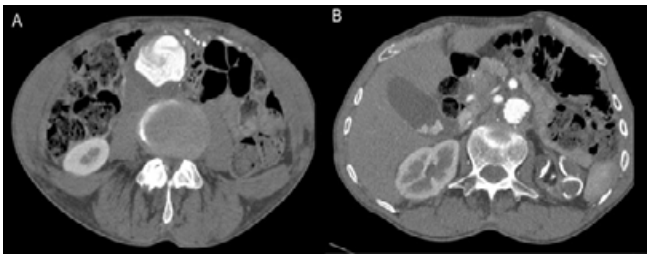



**Figure 1A:** Inflammatory AAA showing the phlegmon of tissue surround the aortic sac wall with no distinction from right psoas muscle, this finding was labelled as a contained leak of AAA, but open surgery demonstrated IAAA typical appearance; **Figure 1B:** Inflammatory AAA with involvement of adjacent structures and adhesions.

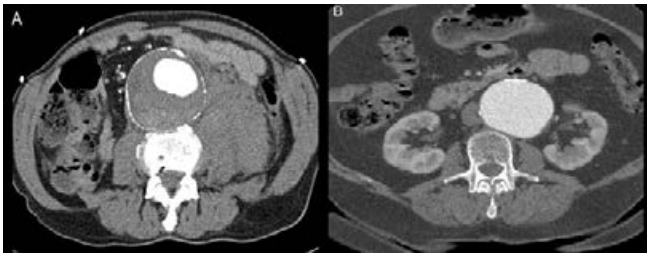



**Figure 2A:** CT of a 7.62 cm atherosclerotic AAA with thrombus; **Figure 2B:** CT scan of a 6 cm atherosclerotic AAA without thrombus with calcification in the anterior aortic sac wall.

### Binary logistic regression

Binary logistic modelling was performed to assess any significant risk factors associated with aneurysm formation, and showed that hypertension and hyperlipidaemia were the only risk factors that were statistical significant in the development of AAAA, with *p* values of 0.03 and 0.04.

### Histopathology

An independent observer performed histopathological examination, which revealed two definitive and distinct categories of AAA: inflammatory and atherosclerotic. Twenty-seven patients out of 80 (33.8%) with AAAA were classified with severe atherosclerotic plaque of the aortic wall containing cholesterol clefts, fibrosis as well as dystrophic calcification. Thirty-six patients out of 80 (45%) and 3 patients out of 12 (25%) with AAAA and IAAA, respectively, were classified with acute inflammation without thrombus. Inflammatory aggregates were composed of lymphocytes and macrophages. Seventeen patients out of 80 (21.3%) with AAAA were associated with degenerative atheroma with the presence of thrombus. Nine IAAA patients (75%) were classified with chronic inflammation of the media and adventitia, without underlying atherosclerotic plaque or atheroma.

### Survival analysis

At 10 years the cumulative aneurysm related survival rate was 75 % and 76 % (Figure 3), and cumulative all cause survival rate was 82%, and 68% (Figure 4) for IAAA and AAAA, respectively ($p$= 0.008 Log rank). At 1 year, aneurysm related survival was 91% for patients with IAAA and 87% for patients with AAAA treated with open surgical repair. There were 14 deaths in the AAAA group and 3 deaths in the IAAA group. The main cause of death was a ruptured aneurysm, which was reported in four patients within the atherosclerotic AAA group. Cardiac arrest was the reported cause of death in two patients with AAAA and one patient in the IAAA group. One patient died of multiple organ failure due to septicaemia in the IAAA group. One patient died of cerebral infarction in the AAAA group. The cause of death was unknown for seven patients in AAAA group and one patient in the IAAA group.

### Major adverse clinical events

Atherosclerotic AAA had an insignificant higher incidence of MACE postoperatively in comparison to IAAA. There was no statistical significance of MACE between both aneurysm groups (Table II).

### Intensive care unit stay

The mean length of intensive care unit (ICU) stay was 5.8 days for atherosclerotic AAA, and 6 days for IAAA (t-test: $p$=0.884, 95% CI 1.713 to 2.086). Median postoperative follow-up was 42.8 months (range 0-120 months) and 37.7 months (range 0-108 months) for IAAA and atherosclerotic AAA, respectively.

## Discussion

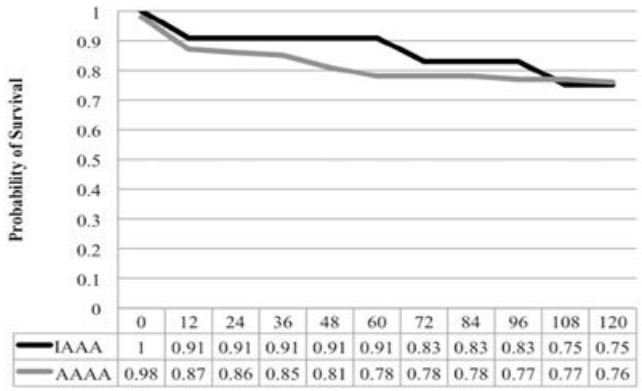
Between the 1st of January 2003 and 1st of July 2013, there were 837 aortic interventions, of which 149 patients had open repair, but only 92 patients had histopathological data available. This highlights the paradigm shift towards endovascular intervention, while histopathology may not be routinely carried out during any open surgical AAA repairs, even in those with a suspected inflammatory or atherosclerotic AAA [19].

Patients with AAAA treated with open repair have a better aneurysm related survival in comparison to those treated for IAAA (76% versus 75%; $p$=0.09), however, further analysis of all cause survival, showed that patients with AAAA faired worse than those IAAA (68% and 82%; $p$=0.008) post open surgical repair. Sasaki et al. reported that incidences of perioperative complications were similar in both AAAA and IAAA groups, and 5-year survival was 74.6% and 80.2% for AAAA and IAAA, respectively [10]. Five-year aneurysm related survival was 78% and 91%, and all cause survival was 77% and 89% for patients with AAAA and IAAA, respectively. There has been a shift in the treatment of AAAs to EVAR throughout the years, which is associated to lower morbidity and mortality rates. A meta-analysis carried out by Kakkos et al. reported the outcomes of open versus endovascular repair (EVAR) of IAAA [20,21]. They reported a 0% mortality rate after EVAR in comparison to 3.6 % after open surgical repair ($p$=1.00). EVAR was also associated with a lower morbidity rate of 11% compared to open surgical repair at 33 %.

There were in-significant differences in postoperative complications post open surgical repair between both AAAA and IAAA groups, indicating patients treated in high volume centres for abdominal aortic aneurysms have better outcomes post-operative. There were no reports of deep vein thrombus between two aneurysm entities; however patients with AAAA had higher rates of pulmonary complications post-operative in comparison to IAAA. Results also showed no significant difference in the length of post-operative ICU stay ($p$=0.884, 95% CI 1.713 to 2.086), corresponding to results reported previously [9,10].

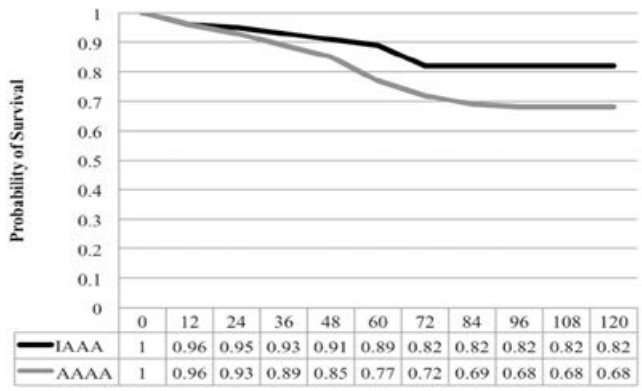
### Risk factors

Patient presentation and medical history did not necessarily lead to a diagnosis of either AAAA or IAAA. Results did show that patients with hypertension or hyperlipidaemia were predisposed to the development of an AAAA. Diabetes did not have a significant effect on the development of IAAA or AAAA. This negative association between diabetes and both types of AAA was demonstrated in previous studies, and even diabetes mellitus may be protective against collagen




| | 0 | 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IAAA | 1 | 0.91 | 0.91 | 0.91 | 0.91 | 0.91 | 0.83 | 0.83 | 0.83 | 0.75 | 0.75 |
| AAAA | 0.98 | 0.87 | 0.86 | 0.85 | 0.81 | 0.78 | 0.78 | 0.78 | 0.77 | 0.77 | 0.76 |

**Figure 3:** Kaplan Meier curve showing 10-year aneurysm related survival.




| | 0 | 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IAAA | 1 | 0.96 | 0.95 | 0.93 | 0.91 | 0.89 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| AAAA | 1 | 0.96 | 0.93 | 0.89 | 0.85 | 0.77 | 0.72 | 0.69 | 0.68 | 0.68 | 0.68 |

**Figure 4:** Kaplan Meier curve showing 10-year survival ($p$=0.008 (log rank).

**Table II:** Postoperative complications.

| | Atherosclerotic AAA (n=80) | Inflammatory AAA (n=12) | *p*-value |
|---|---|---|---|
| Cardiac | 21 (26.25%) | 5 (41.66%) | NS |
| Pulmonary | 13 (16.25%) | 1 (8.33%) | NS |
| Renal insufficiency | 18 (22.5%) | 6 (50%) | NS |
| Cerebrovascular | 1 (1.25%) | 0 | NS |
| Deep vein thrombosis | 0 | 0 | NS |
| Pulmonary Embolism | 1 (1.25%) | 0 | NS |
| Coagulopathy | 7 (8.75%) | 0 | NS |
| Bowel ischemia | 1 (1.25%) | 0 | NS |

degradation and aneurysm expansion [1,17]. Forsdahl et al. associated high serum total cholesterol and low HDL (high-density lipoprotein) cholesterol as significant risk factors for the development of AAAA [3].

Family history of AAA was insignificant in determining development of any particular type of AAA. There was also no association between smoking and family history and the prediction of either AAAA or IAAA. These findings are possibly due to small cohort size, and modest significance. A number of previous studies have shown that both smoking and family histories are major risk factors in the development of AAA. Kent et al. [4,17] reported findings in which well-known risk factors including male gender, age, family history, and cardiovascular disease were reiterated in AAA development. There was no difference in maximum diameter between both groups, 70.1 mm for AAAA versus 80.0 mm for IAAA.

Patient blood cultures were negative for infection. There was no evidence to support the theory that Endovascular AAA are instigated by infection. This leads us to believe that IAAA are a genetic abnormality, which may be determined via cell mapping. Both Ehrenfeld et al. and Rasmussen et al. mapped HLA-DR B1 locus and the alleles B1*15 and B1*0404 in patients with IAAA. Results demonstrated a genetic predisposition to the development of IAAA [22,23].

## Conclusion

In spite of the complexity in repair of IAAA, results do show an encouraging long-term survival rate coupled with low postoperative complications for patients with IAAA and AAAA, treated by open surgical repair in high volume centres. IAAA could not be linked directly to any definitive risk factors, while hypertension and hyperlipidaemia were associated with AAAA. Furthermore, there was no link found between infection and the development of IAAA. Further work is required to determine definitive genetic risk factors. Analysis of larger cohorts of patients is also required to identify the exact cause of these two aortic diseases.

### Conflict of interest

None of the authors have any financial arrangement or other relationship that could be construed as a conflict of interest.

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Journal of Surgery
[Jurnalul de Chirurgie]

Research Article Open Access

# Safety and Efficacy of Laparoscopic Ventral Mesh Rectopexy and Sacrocolpopexy for Rectal Prolapse and Obstructed Defecation: Analysis of First 20 Cases at a UK District General Hospital

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## Abstract

**Introduction**: Laparoscopic ventral mesh rectopexy (LVMR) is gaining wider acceptance. The aim of this study is to present that LVMR can be learnt and safely performed with short term results similar to that of establish centres.

**Materials and Methods**: All underwent anorectal physiology, defecation proctography, colon transit studies, colonoscopy or sigmoidoscopy as appropriate and pelvic floor MDT and biofeedback. Patients with high grade intussusception who did not respond to laxatives and biofeedback were offered LVMR. Surgical technique was as described by D'Hoore et al. and performed by both authors. Data are presented as median, range and proportions.

**Results:** Median age, ASA & BMI were 60.5 (34-78), 2 (1-3), 26.1 (20.4-33.1). Previous pelvic surgery included hysterectomy (35%), vaginal wall repair (15%) and rectal prolapse surgery (20%). 45% had Oxford prolapse grades 3/4 and rest were grade 5. Median operative time was 229 minutes (175-330). Synthetic mesh was used in 16 patients (Parietex 30%, TiLENE 50%) and Permacol in four (20%). 30 day mortality was zero. There were no conversions and overall complication rate was 10%.Sexual dysfunction was not reported. Median length of stay was 3 (2-6). 17 patients (85%) had 6 months or more follow up. Median patient reported outcome for satisfaction was 9.5 on a scale of 1 to 10 (2-10). Two patients developed recurrences of ODS at 6 and 12 months.

**Discussion and Conclusions**: We suggest that experienced laparoscopic surgeons can learn and safely perform laparoscopic ventral mesh rectopexy.

**Keywords:** Laparoscopy; Rectal prolapse; Intussusception; Pelvic floor disorder; Surgical mesh

## Introduction

Laparoscopic ventral mesh rectopexy (LVMR) is gaining wider acceptance amongst colorectal surgeons as the technique that can address symptoms of both external and internal rectal prolapse. It also allows correction of any associated rectocele, enterocele and posterior vaginal wall prolapse as well as vault prolapse. The learning curve for LVMR is unknown and there is no consensus on case selection. The aim of this study is to share our results to show that LVMR can be learnt and safely performed by experienced laparoscopic colorectal surgeons in district general hospitals with short term results similar to that of establish centres.

## Methodology

Prior to start of this retrospective study UK National Health Service Health Research Authority website was consulted and NHS Research Ethics Committee approval was not required. The procedures followed were in accordance with the principles of the Helsinki Declaration of 1975, as revised in 2000.

Laparoscopic Ventral Mesh Rectopexy was started at our institution in January 2011. All patients presented with obstructed defecation syndrome (ODS) and rectal prolapse from January 2011 to January 2015 are included in this analysis. Patients presenting to the out patients department with symptoms of difficulty in evacuation, sense of incomplete evacuation, pelleted stools, frequent visits to the toilet, perineal, vaginal or anal digitation, incontinence and pelvic pain were clinically diagnosed as having obstructed defecation. All with such symptoms were investigated with anorectal physiology, defecation proctography, colon transit studies, colonoscopy or sigmoidoscopy as appropriate. Patients with obvious rectal prolapse underwent either colonoscopy or sigmoidoscopy as indicated.

Fluoroscopic defecography was performed with vaginal, oral and bladder contrast. Defecography, anorectal physiology and symptoms were discussed in the fortnightly pelvic floor MDT which consists of two colorectal surgeons (both authors), one radiologist, the radiographer who performs defecography, one urogynaecologist and the colorectal nurse specialist who performs anorectal physiology and biofeedback. Fluoroscopy films were reviewed by all MDT members and intussusception was graded according to oxford prolapse grade [1] (Grade 1- High recto rectal intussusception, Grade 2- Low recto-rectal intussusception, Grade 3- High recto-anal intussusception, Grade 4- Low recto-anal intussusception, Grade 5- Complete rectal prolapse). Evacuation time, number of attempts at evacuation and speed of opening of the anal canal were considered as subjective global markers of evacuation efficiency. In the case of rectocele barium trapping in the rectocele was considered significant. All patients with ODS then underwent maximal medical therapy as well as biofeedback. Since 2012 patients are offered trans anal irrigation as a form of conservative treatment if they do not respond to maximal medical therapy. Patients with high grade intussusception (Grade 3 and 4) and reduced

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evacuation efficiency who did not respond to maximal medical therapy and biofeedback or did not respond to trans anal rectal irrigation were offered LVMR.

Surgical technique was as described by D'Hoore et al. [2] and was performed by both authors who are experienced laparoscopic colorectal surgeons. The senior author (GF) had visited Bristol pelvic floor centre prior to offering LVMR at our Hospital.

We initially used lightweight monofilament polyester mesh (Parietex™) 4×20 cm. This was later changed to Titanium coated lightweight polypropylene mesh (TiLENE®) 4 × 20 cm for older patients or for patients who had completed the family. 4 cm ×18 cm × 1 mm biological mesh (Permacol™) was used in young patients and in patients who are in reproductive age. Length of the mesh was adjusted by cutting it intracorporeally if required, to an appropriate length to allow the distal length to reach the pelvic floor and the proximal end to be fixed to the sacral promontory without any tension. The suturing was intracorporeal and Ethibond Excel®2/0 was used to attach the mesh to the rectum. Vicryl® 2/0 was used for colpopexy and ProTack™ 5 mm for attaching the mesh to the sacral promontory. Excision of the pouch of Douglas was performed when an enterocele was present. Peritoneum was closed with continuous 2/0 Vicryl covering the mesh completely.

Data concerning demographics, operative data, complications, length of stay, recurrence and patient reported outcome were gathered from a prospective data base. Data were analysed using SOFA statistical software and are presented as median, range and proportions.

## Results

All twenty patients were females with median age of 60.5 (range 34-78). The cohort's median body mass index was 26.1 (range 20.4-33.1) (Figure 1A and B). The median ASA grade was 2 (range 1-3) and most belonged to ASA 2.

Majority of the patients did not have previous pelvic surgery or prolapse surgery prior to LVMR. Seven patients (35%) had hysterectomy or suture Sacrocolpopexy. Three patients (15%) had vaginal prolapse surgery and four patients (20%) had recurrent rectal prolapse. Five patients (25%) were having middle compartment prolapse whereas eight (40%) had rectocele and five patients had enterocele at the time of surgery (Table 1).

Nine patients (45%) underwent LVMR for obstructive defecation due to high grade intussusception and 11 patients (55%) had complete rectal prolapse. Most patients (80%) underwent synthetic mesh rectopexy whereas four patients (20%) had a biologic mesh (Figure 2).

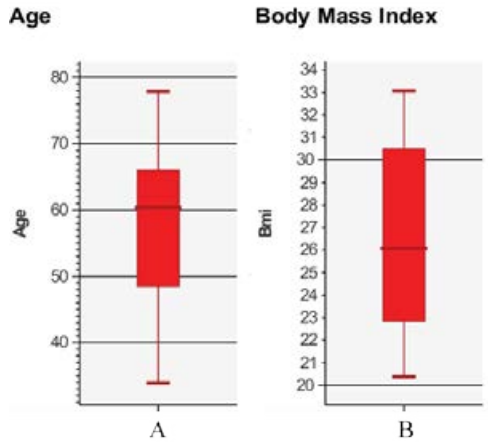


**Figure 1:** Box and whisker plot showing median, quartiles and range; A: Age; B: Body Mass Index.

All operations were successfully completed laparoscopically without need for open conversion. 30 day mortality was zero. Overall complication rate was 10% (one wound infection and one port site hernia). No intraoperative complications occurred. Mesh related complications and sexual dysfunction were not reported during the period of follow up. Median operative time was 229 minutes (175-330) and median length of stay was 3(2-6) (Figure 3(A,B)). Total 17 patients (85%) had 6 months or more follow up (range 2 weeks-4 years). One patient developed recurrence of rectal prolapse after 1 year of follow up. One patient who had biological mesh for ODS developed recurrent symptomatic intussusception as well as new onset anterior and posterior vaginal prolapse after 6 months. Median patient reported satisfaction was 9.5 (range 2-10) (Figure 3(C)).

## Discussion

Laparoscopic ventral mesh rectopexy is now considered safe and effective and results of large case series from tertiary centres [3-5] and systematic reviews [6,7] support this view. To our knowledge so far results of LVMR from a district general hospital in the UK has not been published. Our results in this series support that LVMR for rectal prolapse and ODS can be performed safely and effectively in a district general hospital.

Rectal prolapse and ODS is profoundly debilitating disease mainly involving older age group who are not willing to travel far for investigation and treatment. Having a pelvic floor service locally would greatly enhance delivery of good quality patient care.

We are aware of several controversies surrounding the increasing use of LVMR. There are no randomized controlled trials regarding this procedure for external rectal prolapse or ODS. No studies have been identified which compare LVMR with other surgical treatments, non-surgical treatments, or sham/no treatment for external rectal prolapse or ODS. DELivAR (Delorme's vs anterior rectopexy), a multicentre UK Health Technology Assessment commissioned randomized trial of Delorme's procedure compared with laparoscopic anterior rectopexy for external rectal prolapse is being set up and should provide the definitive answer. Restoration of normal anatomy was considered to be a definition of success, but this concept may be wrong. If ODS is caused by dysfunction of motility and sensitivity in the rectosigmoid, restoration of anatomy may only have a placebo effect. A clear correlation between surgical correction of the anatomical abnormalities and improvement in ODS has not been demonstrated. However in this series our patient selection was highly selective and guided by complete preoperative investigations, multidisciplinary discussion and maximal medical therapy. We believe this approach is essential to answer these uncertainties and controversies. Recently a panel of experts published a consensus statement [8] regarding ventral mesh rectopexy and our practice is almost consistent with the recommendations except we use permanent suture (Ethibond Excel®2/0) material to fix the mesh to the anterior rectum.

The choice of the prosthetic to be used in ventral mesh rectopexy is the remaining area of controversy. The relatively low costs of the synthetic prosthetics are attractive, but there are safety concerns with synthetic meshes and polyester mesh appears to be associated with increased mesh related complications and its use is discouraged. Biological meshes have been shown to be safe and effective. However number of biological meshes used are small and the long-term efficacy of biological materials in pelvic floor repair has yet to be defined [8,9]. The increased cost of the bio prosthetics is also of concern [10-13]. Long-term evidence and well-powered randomized trials are needed to fully define the roles of the various meshes in

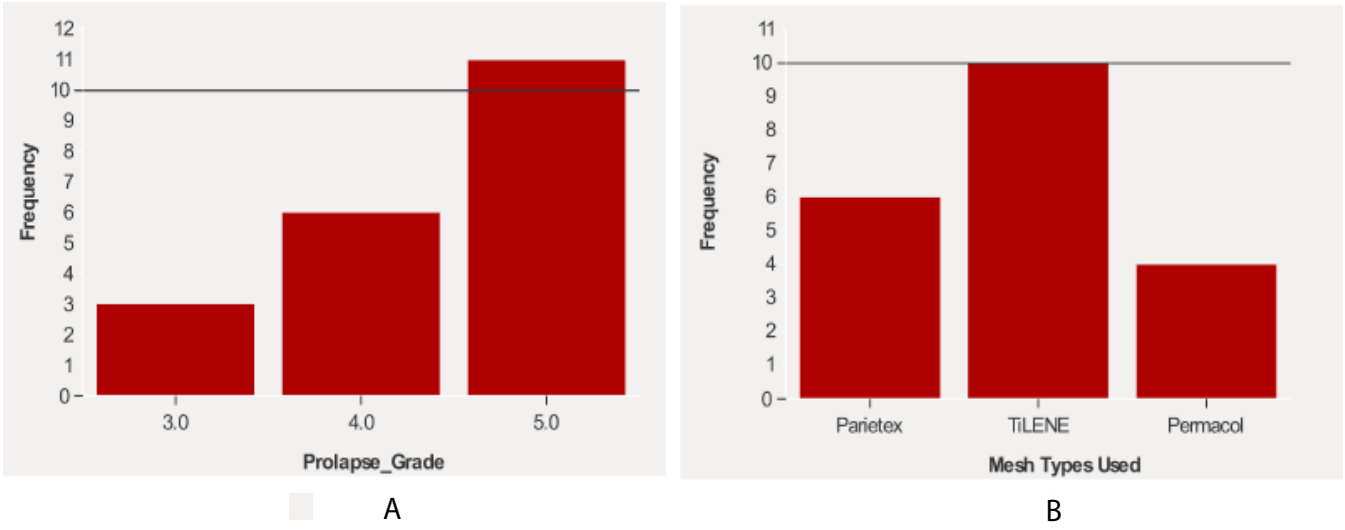


**Figure 2:** Bar charts of prolapse grade and type of meshes; A: Prolapse grades of patients who underwent LVMR; B: Types of meshes used in LVMR.

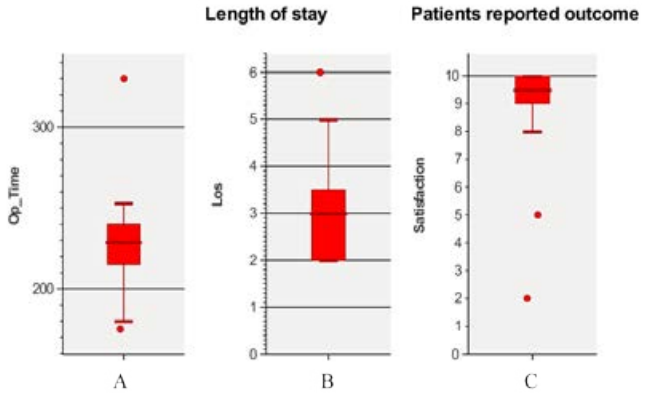


**Figure 3:** Box and whisker plot showing median, quartiles and range; A: Operative time (minutes); B: Length of Stay (days); C: Patient reported satisfaction on a scale of 1 to 10.

ventral mesh rectopexy.

There is no consensus on the learning curve which is assumed to be considerable, one study suggesting between 80 to 100 cases [8,9]. We do support the view that dissection in the pelvis and particularly suturing in the pelvis are demanding and require advanced laparoscopic skills. We believe that the learning curve for all the surgeons is not necessarily the same and laparoscopic technology has improved considerably and learning LVMR is more straightforward. Short term results in our series are similar to that of tertiary centres. However the median operating time and median length of stay are much longer. This reflects the fact that both operating surgeons were in their learning curve. It's also due to the fact that we took extreme care when dissecting the rectovaginal plane to avoid injury to either rectum or the vagina which would increase the risks associated with the mesh. Additionally our practice of intracorporeal suturing of the mesh contributed to the longer median operating time. There is now evidence that day case LVMR is safe and achievable [14].

There are number of limitations in this series. Follow up period is short and numbers are small. Although patient's satisfaction is high this outcome measurement is subjective. LVMR is now accepted as safe procedure that can effectively address the symptoms of rectal prolapse and obstructive defecation. There are evidence to support the view that LVMR is safe in the elderly [15] and can be performed safely in the emergency setting. Symptoms improvement needs to be assessed objectively using validated symptoms questionnaires preoperatively as well as during follow up [16]. Therefore we have recently started using Longo's validated obstructive defecation symptom score and wexner faecal incontinence score as disease specific objective assessment of symptom severity. To assess quality of life we now use The EuroQol Group's validated EQ-5D health questionnaire .There are no published results of studies that have assessed long term quality of life using validated quality of life questionnaires. One study [17] has published quality of life using the French validated version of the gastrointestinal quality of life form (GIQLI) and shown improved quality of life at 1 year.

## Conclusion

LVMR can be learnt and performed safely by experienced laparoscopic colorectal surgeons with relatively straightforward

**Table I:** Summary of previous pelvic surgery and defecography findings.

| | Type | Frequency | % ¶ |
|---|---|---|---|
| **Previous Surgery** | | | |
| Pelvic Surgery | Hysterectomy | 6 | 30% |
| | Suture Sacrocolpopexy | 1 | 5% |
| | No Surgery | 13 | 65% |
| Vaginal Prolapse | Anterior + Posterior Repair | 3 | 15% |
| | No Surgery | 17 | 85% |
| Rectal Prolapse | Delorme's Procedure | 2 | 10% |
| | Laparoscopic Suture Rectopexy | 2 | 10% |
| | No Surgery | 16 | 80% |
| **Defecography** | | | |
| Rectocele | Small | 2 | 10% |
| | Moderate | 4 | 20% |
| | Large | 2 | 10% |
| | None | 12 | 60% |
| Enterocele | Present | 5 | 25% |
| | None | 15 | 75% |
| Middle Compartment | Uterine Prolapse | 1 | 5% |
| | Anterior Vaginal Wall Prolapse | 1 | 5% |
| | Posterior Vaginal Wall Prolapse | 1 | 5% |
| | Anterior + Posterior Wall Prolapse | 2 | 10% |
| | None | 15 | 75% |

¶ denotes proportions as percentages.

learning curve. We believe best outcome can be achieved when patients are managed and selected for operative intervention in a multidisciplinary setting. We strongly support the view that outcome reporting contributes greatly to achieve quality surgical care.

### Conflict of interest

None of the authors have any financial arrangement or other relationship that could be construed as a conflict of interest.

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Research Article Open Access

# Quality of Life and Level of Anxiety in Patients after Gallbladder Surgery

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## Abstract

**Introduction**: Cholelithiasis involves the presence of gallstones that form in the biliary tract, usually in the gallbladder. Symptomatic cholelithiasis is an indication for surgical treatment. Quality of life and patient satisfaction following surgery is an important aspect in predicting treatment outcomes.

**Aim**: Measurement of quality of life, including the level of anxiety state and dynamics of changes of individual components (physical, mental, social, and environmental) over time (from qualifying for operations and the postoperative period, up to 6 months after surgery) in patients undergoing open and laparoscopy cholecystectomy.

**Material and methods**: The study group consisted of 105 people at the Clinical Department of Surgery, County Hospital in Tychy. The patients were divided into two groups, laparoscopic surgery (n = 83) and classical (n = 22). Tests on selected patients have been carried out before the operation, 1 month after and 6 months after surgery with the "quality of life questionnaire WHOQOL BREF" and "Inventory status and the guild anxiety STAI X1". The results were compared using statistical methods.

**Results:** In the group treated by laparoscopy better quality of life and lower levels of anxiety were observed after 6 months of treatment. Before surgery and one month after the procedure, significantly lower values of physical and mental disciplines were reported in the group operated laparoscopically than in patients operated by the classical method.

**Conclusion**: In patients undergoing laparoscopic surgery higher quality of life and lower levels of anxiety in the 6 month follow-up were observed, compared to patients operated conventionally.

**Keywords:** Laparoscopy; Anxiety; Cholecystectomy; Gallbladder; Life quality

## Introduction

Cholelithiasis involves the presence of gallstones, which are concretions of cholesterol, bilirubin, calcium salts, and other ingredients that form in the biliary tract, usually in the gallbladder [1]. Symptomatic cholelithiasis is an indication for surgical treatment. The presence of gallstones is not an indication for surgery. Almost half of the population over age 60 has gallstones, but only a small part suffers from pain related to the condition. Cholecystectomy for asymptomatic gallstones may be indicated in patients with diabetes mellitus, cardiac transplant recipients, oncologic patients and ones who require immunosuppressive and cytostatic therapy [1-3].

Cholecystitis may present differently in special populations, as follows: Elderly – may present with vague symptoms and without many key historical and physical findings (e.g., pain and fever), with localized tenderness the only presenting sign; may progress to complicated cholecystitis rapidly and without warning; Children – May present without many of the classic findings; those at higher risk for cholecystitis include those who have sickle cell disease, serious illness, a requirement for prolonged total parenteral nutrition (TPN), haemolytic conditions, or congenital and biliary anomalies.

## Diagnosis

Laboratory tests are not always reliable, but the following findings may be diagnostically useful: leukocytosis with a left shift may be observed, alanine aminotransferase (ALT) and aspartate aminotransferase (AST) levels may be elevated in cholecystitis or with common bile duct (CBD) obstruction, bilirubin and alkaline phosphatase assays may reveal evidence of CBD obstruction, amylase/lipase assays are used to assess for pancreatitis; amylase may also be mildly elevated in cholecystitis, alkaline phosphatase level may be elevated (25% of patients with cholecystitis). All females of childbearing age should undergo pregnancy testing Diagnostic imaging modalities that may be considered include the following: Radiography, ultrasonography, computed tomography (CT), magnetic resonance imaging (MRI), hepatobiliary scintigraphy, Endoscopic retrograde cholangiopancreatography (ERCP).

When choosing a method of treatment, we pay attention to interfere with the function and efficiency of the organism as little as possible and where possible to restore the body to its original state of health. Quality of life and patient satisfaction following surgery is an important aspect in predicting treatment outcomes. Quality of life as a concept is intuitively easy to understand, but it has proven difficult to define. In medicine we evaluate quality of life basing on health-related factors, and the approach determines the impact of the disease on physical, psychological and social aspects of life and well-being [2].

To fully assess a patient's quality of life we should determine his or her mood, depending on the severity of symptoms of a disease or treatment, mental and physical health, and social functioning of the patient. Anxiety accompanies human beings throughout their lives and it is defined as a negative emotion connected with the anticipation of danger coming from outside or inside of the body.

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Anxiety is the fear of anticipated threats, unpleasant for an individual, it is a negative emotion induced by a factor (situation or object), subjectively considered as threatening [4-6]. Symptoms of anxiety are divided into physiological, psychological and behavioural. The physiological include tachycardia, rapid breathing, high blood pressure, increased muscle tension, abdominal pain, and urinary incontinence. The mental symptoms are: fatigue, insecurity, low self-esteem, disengagement from interpersonal relations, cognitive disorders. Behavioural symptoms include restlessness, pointless activities, frequent position changes, twitches. In addition to those, we observe speech disorders and insomnia. In the medical literature there are no studies on the levels of anxiety in patients treated surgically for cholelithiasis [6,7].

## Aims of the Study

1. Assessment of quality of life in all its components (physical, mental, social, environmental) in patients undergoing cholecystectomy by laparoscopic and classical method.

2. Appraisal of the dynamics of changes in individual components of quality of life over time (from qualifying to operations and the postoperative period, up to 6 months after surgery).

3. Examining the factors that may affect quality of life, the treatment effect, and levels of anxiety (measured according to the STAI scale) in the period of time which was the subject of the analysis.

## Material and Methods

The research was conducted in years 2006-2012. The study group consisted of 205 patients who underwent cholecystectomy. 105 people were enrolled for the research analysis, including 77 women and 28 men aged 27 to 72. Patient characteristics are listed in (Table I). The research study enrolled people treated at the Clinical Department of Surgery, County Hospital in Tychy. In the study patients operated on gallstone disease, cholecystitis (acute and chronic) and cholecystitis complications (for example pancreatitis) were included. Patients with metabolic disorders (hypercholesterolemia, obesity, diabetes) were also allowed. The analysis excluded patients with chronic diseases (e.g. stomach and bowel disorders, musculoskeletal disorders, mental illnesses, gallbladder cancer, other cancers), and pregnant women. Tests on selected patients were carried out before the operation, one month after surgery, and six months after the operation. The data obtained from the World Health Organization Quality of Life questionnaire WHOQOL BREF (Table II) and the Stare-Trait Anxiety Inventory STA1 was compared and evaluated using statistical methods (Table III).

The statistical analysis was carried out using Statistica 7.0. Calculations included the mean values, standard deviations, and medians of the studied parameters. The normality of the distribution was evaluated with the Kolmogorov–Smirnov test. In the case of normal distributions, the student's t-test for unpaired variables was used for comparisons between groups. In order to compare the results between time points the Wilcoxon test was used. The frequency of the studied traits was calculated. The statistical significance *level* was $p<0.05$.

Statements included in the scale are formulated in such a way that sometimes the highest anxiety level is indicated by 4, other time by 1. This prevents the participants from providing automatic answers and minimizes the impact of the *acquiescence* variable. The WHOQOL questionnaire makes it possible to obtain a profile of the quality of life in four domains (physical, psychological, social relationships, and environment). The scores reflect the individual's perception of the quality of life in these four areas. The greater the number of points on the scale, better the quality of life. The questionnaire contains 26 questions.

## Results

During the study there was a statistically significant difference between the group of patients after laparoscopic cholecystectomy, and the group of patients who underwent classic treatment. The difference observed before the treatments in the areas of physical and mental characteristics was favourable to the patients operated on in the classical way. Similar relationships between groups in the areas of physical and mental characteristics were observed one month after surgery. However, 6 months after the operation there were no statistically significant differences in these areas between the two groups of patients. Patients who were treated by open cholecystectomy, just before surgery, declared a slightly higher quality of life in physical and mental areas, and this trend was evident even after a month. Table IV presents the results of the questionnaire WHOQOL-BREF, evaluating quality of life. Before surgery, and one month after, in the group operated on laparoscopically there were significantly lower values of quality of life, both physical and psychological, than in patients operated on by the open method. However, after 6 months, a statistically significant difference was observed in social relations for the benefit of patients operated on by the open method. In the areas of physical and mental health in the whole study group a statistically significant increase of quality of life was seen after 6 months, compared to the values before and one month after surgery. In the areas of physical and mental characteristics in the laparoscopic surgery group we observed a statistically significant increase in value after 6 months, compared to the state before and one month after surgery (Figure 1). In the group of patients operated on by the classical method a statistically significant increase in the quality of life was found in the scale of social relations only, after 6 months, compared to values obtained before and one month after surgery. Furthermore, it is noticeable that in this group no difference in the physical, psychological and environmental fields in all the surveyed points in time was observed (Figure 2).

In the physical and mental areas in the laparoscopic surgery group we have observed a statistically significant increase in value after 6 months compared to the state before and one month after (Figure 1). In the group of patients operated on by the open method a statistically significant increase in the quality of life was found only in the scale of social relations after 6 months compared to values obtained before and one month after surgery. Furthermore, it is worth noting that in this group no difference in the physical, psychological or environmental fields was observed in any of the periods researched (Figure 2).

To measure the level of anxiety in patients the STAI questionnaire was used and the results are given in Table V. After 6 months of treatment in the laparoscopic surgery group significantly lower anxiety symptoms were observed than in the group operated on by open cholecystectomy. Despite the lapse of six months almost half of the patients treated by open cholecystectomy felt anxiety (Figure 3). Higher levels of anxiety in patients 6 months after open cholecystectomy could be the result of persistent abdominal symptoms in the type of ZPC, concerns about the onset of late complications of laparotomy (ileus), scars, and illness recurrence.

**Table I:** Characteristics of patients.

| | | Altogether (n = 105) | | Laparoscopy (n = 83) | | Open cholecystectomy (n = 22) | |
|---|---|---|---|---|---|---|---|
| | | N | % | N | % | N | % |
| Śex | Female | 77 | 72.7 % | 61 | 73.5% | 16 | 72.7 % |
| | Male | 28 | 26.3 % | 22 | 26.5% | 6 | 26.3 % |
| Age [years] | | 56.8 ± 11.8 | | 55.9 ± 12.5 | | 60.5 ± 8.7 | |
| Comorbidities | YES | 67 | 63.8% | 55 | 66.3% | 12 | 63.8 % |

**Table II:** World Health Organization Quality of Life questionnaire WHOQOL

| | | | | |
|---|---|---|---|---|
| **1. How satisfied are you with the quality of your life?** | | | | |
| Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Satisfied | Very satisfied |
| **2. How happy you are for your health?** | | | | |
| Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Satisfied | Very satisfied |
| The following questions relate to what extent or how you felt certain things in the past 2 weeks.<br>**3. To what extent do you feel that physical pain restricts you in doing what you want?** | | | | |
| At all | Little | Quite strongly | Very strongly | Extremely strongly |
| **4. To what extent lead a normal, everyday life depend on any treatment?** | | | | |
| At all | Little | Quite strongly | Very strongly | Extremely strongly |
| **5. How much do you enjoy life?** | | | | |
| At all | Little | Quite strongly | Very strongly | Extremely strongly |
| **6. To what extent do you feel that your life has meaning, significance?** | | | | |
| At all | Little | Quite strongly | Very strongly | Extremely strongly |
| **7. How easily can you focus on?** | | | | |
| At all | Little | Quite easy | Very easy | Extremely easy |
| **8. Do you feel safe in your daily life?** | | | | |
| At all | Little | Average | Very safe | Extremely safe |
| **9. How healthy you feel the area in which you live?** | | | | |
| At All | Little health | Quite healthy | Very healthy | Extremely healthy |
| The following questions relate to the extent to which you were able to perform things in the past 2 weeks.<br>**10. Do you have enough forces - "energy" to lead a normal life?** | | | | |
| At All | Little | Average | Almost enough | Enough |
| **11. Are you ableto accept your appearance?** | | | | |
| At all | Little | Average | Mostly | Completely |
| **12. Do you have enough money for Your needs?** | | | | |
| At all | Little | Average | Almost enough | Enough |
| **13. To what extent are available to you the information you need for everyday life?** | | | | |
| At all | Little | Average | Mostly | Completley |
| **14. To what extent you have the possibility of such leisure activities as you wanted to?** | | | | |
| At all | Little | Average | Almost enough | Enough |
| **15. To what extent can you move?** | | | | |
| Very bad | Bad | Neither good nor bad | Good | Very good |
| The following questions relate to how satisfied and happy you felt in relation to the various spheres of life in the past 2 weeks.<br>**16. How satisfied are you with your sleep?** | | | | |
| Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Satisfied | Very satisfied |
| **17. How satisfied are you with their ability to lead a normal daily life?** | | | | |
| Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Very dissatisfied | Dissatisfied |
| **18. How satisfied are you with your ability to work (paid or unpaid, at home)?** | | | | |
| Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Very dissatisfied | Dissatisfied |
| **19. How satisfied are you with yourself?** | | | | |
| Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Very dissatisfied | Dissatisfied |
| **20. How satisfied are you with your personal relationships?** | | | | |
| Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Very dissatisfied | Dissatisfied |
| **21. How satisfied are you with your sex life?** | | | | |
| Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Very dissatisfied | Dissatisfied |
| **22. How satisfied are you with the support you receive from your friends?** | | | | |
| Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Very dissatisfied | Dissatisfied |
| **23. How satisfied are you with the conditions in which you live?** | | | | |
| Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Very dissatisfied | Dissatisfied |
| **24. How satisfied are you with access to medical care?** | | | | |
| Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Very dissatisfied | Dissatisfied |
| **25. How satisfied are you with its ability to move up?** | | | | |
| Very dissatisfied | Dissatisfied | Neither satisfied nor dissatisfied | Very dissatisfied | Dissatisfied |
| The following question refers to how often during the last 2 weeks you felt some conditions.<br>**26. How often are You going through the unpleasant feelings such as sadness, dejection, anxiety, depression?** | | | | |
| Never | Rarely | quite often | Very often | Always |

**Table III:** The questionnaire STA1

| | | Definitely not | Rather not | Rather yes | Definitely yes |
|---|---|---|---|---|---|
| 1. | I am calm | 1 | 2 | 3 | 4 |
| 2. | I feel safe | 1 | 2 | 3 | 4 |
| 3. | I am tight | 1 | 2 | 3 | 4 |
| 4. | I am resentful | 1 | 2 | 3 | 4 |
| 5. | I feel at ease | 1 | 2 | 3 | 4 |
| 6. | I am depressed | 1 | 2 | 3 | 4 |
| 7. | I worry if something bad happens | 1 | 2 | 3 | 4 |
| 8. | I feel rested | 1 | 2 | 3 | 4 |
| 9. | I feel anxiety | 1 | 2 | 3 | 4 |
| 10. | I am comfortable | 1 | 2 | 3 | 4 |
| 11. | I feel confident | 1 | 2 | 3 | 4 |
| 12. | I'm nervous | 1 | 2 | 3 | 4 |
| 13. | I'm jittery | 1 | 2 | 3 | 4 |
| 14. | I am "undermined" | 1 | 2 | 3 | 4 |
| 15. | I am relaxed | 1 | 2 | 3 | 4 |
| 16. | I'm happy | 1 | 2 | 3 | 4 |
| 17. | I'm worry | 1 | 2 | 3 | 4 |
| 18. | I feel overly excited | 1 | 2 | 3 | 4 |
| 19. | I am joyful | 1 | 2 | 3 | 4 |
| 20. | I am pleasant | 1 | 2 | 3 | 4 |

**Table IV:** Quality of Life questionnaire WHOQOL

| | | Totally (n=105) | | | Laparoscopic surgery (n=83) | | | Open surgery (n=22) | | | Comparison of methods |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | śr | mediana | SD | śr | mediana | SD | śr | mediana | SD | |
| **Przed operacją** | **Physical sphere** | 67 | 64 | 13 | 65 | 64 | 13 | 73 | 78 | 13 | **0.0033** |
| | **Mental sphere** | 65 | 62 | 13 | 63 | 62 | 13 | 71 | 75 | 12 | **0.0105** |
| | **Social relations** | 76 | 75 | 13 | 76 | 75 | 13 | 77 | 75 | 12 | NS |
| | **Environment** | 70 | 71 | 13 | 69 | 71 | 14 | 70 | 71 | 10 | NS |
| **1 miesiąc po operacji** | **Physical sphere** | 65 | 67 | 14 | 63 | 64 | 13 | 76 | 78 | 14 | **<0.001** |
| | **Mental sphere** | 64 | 62 | 14 | 62 | 62 | 14 | 72 | 75 | 12 | **0.0038** |
| | **Social relations** | 74 | 75 | 14 | 73 | 75 | 14 | 77 | 75 | 13 | NS |
| | **Environment** | 68 | 70 | 15 | 67 | 68 | 15 | 71 | 71 | 12 | NS |
| **6 miesiący po operacji** | **Physical sphere** | 71 | 71 | 15 | 70 | 71 | 15 | 76 | 78 | 14 | NS |
| | **Mental sphere** | 69 | 70 | 15 | 68 | 70 | 16 | 72 | 75 | 13 | NS |
| | **Social relations** | 75 | 75 | 15 | 74 | 75 | 16 | 82 | 83 | 12 | **0.0366** |
| | **Environment** | 71 | 75 | 14 | 71 | 75 | 15 | 73 | 74 | 12 | NS |

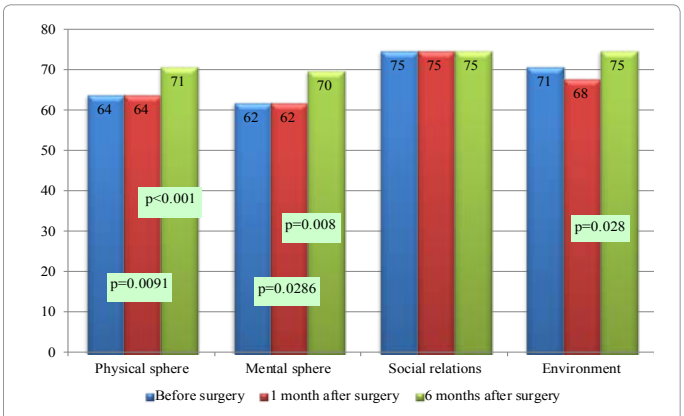


**Figure 1:** Comparison of quality of life in questionnaire WHOQOL – BREF in a group after laparoscopic surgery in the studied time points.

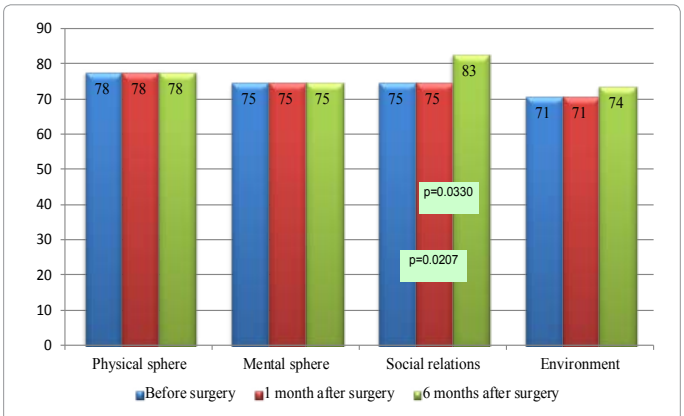


**Figure 2:** Comparison of quality of life in questionnaire WHOQOL – BREF in a group after open surgery in the studied time points.

**Table V:** Stare-Trait Anxiety Inventory STA1

| | Totally (n=105) | | | Laparoscopic surgery (n=83) | | | Open surgery (n=22) | | | Comparison of methods |
|---|---|---|---|---|---|---|---|---|---|---|
| | śr | mediana | SD | śr | mediana | SD | śr | mediana | SD | |
| **Before surgery** | 47 | 47 | 9 | 46 | 47 | 10 | 48 | 48 | 6 | NS |
| **1 month after surgery** | 45 | 47 | 9 | 44 | 45 | 10 | 48 | 49 | 6 | NS |
| **6 months after surgery** | 44 | 47 | 9 | 42 | 45 | 9 | 49 | 50 | 4 | **0.0059** |

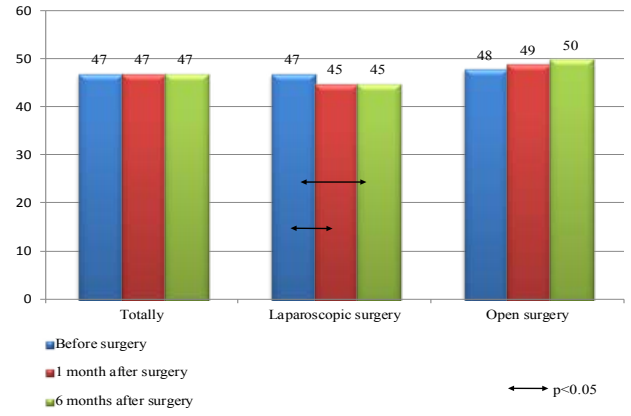


**Figure 3:** The level of anxiety in the studied time points.

## Discussion

The analysis of quality of life in the studied groups has shown that patients undergoing laparoscopic treatment show higher quality of life 6 months after surgery. The explanation of this fact can be the lesser surgical trauma they suffer, shorter hospitalization, and faster recovery. The fact that these patients presented less symptoms of ZPC is also significant. Better quality of life in the field of social relationships in patients operated on by the classical method after 6 months of treatment, compared to those treated by the laparoscopic method is intriguing. It seems that the sum of unpleasant experiences related to the operation, greater physical and mental suffering caused by prolonged hospital stays, and consequently subsequent return to full health, increase the patients' endurance. The patients in question could re-evaluate their social relationships and see them in a slightly better light than before the operation. Budzynski notes that the quality of life of patients after laparoscopic cholecystectomy improves sooner than after classical surgery. Laparoscopic cholecystectomy allows for a shorter hospital stay, faster return to full activity and less pain in the postoperative period than classical cholecystectomy [8]. Carraro shows higher quality of life in patients after laparoscopic cholecystectomy, as compared to the classical method. The development of the laparoscopic technique radically changed the treatment of cholelithiasis and cholecystitis. The result is obviously clinically beneficial to patients. Over the years the implementation of laparoscopic cholecystectomy has reduced the number of complications and mortality rates of patients undergoing surgery. The collected data confirms the positive assessment of the quality of life after laparoscopic cholecystectomy is performed. The increasing rate of quality of life after laparoscopic cholecystectomy is higher than in open surgery. Higher satisfaction rate for surgical scars after surgery has also been conformed [9]. Matovic confirms the results implicating that the quality of life in patients treated by laparoscopic cholecystectomy is higher than the quality of life in patients operated on by open cholecystectomy. Fitness, emotional state, and social activity, are much better in patients treated by laparoscopic cholecystectomy. Comparative study between laparoscopic cholecystectomy and open surgery, depending on the aspects of quality of life, confirms the advantage of laparoscopy as compared to the open cholecystectomy method [10]. Kaska conducted a review of the available databases, Medline and PubMed, for medical literature describing the quality of life after surgery and classic laparoscopic treatment. Based on 30 items which implement a standardized questionnaire, he concludes that the quality of life questionnaire does not appear to be the most appropriate tool which can be used for comparing, in this case, not even two operational procedures, but only two accesses per open and laparoscopy procedure. He writes that the Quality of Life Survey is a research instrument especially important in chronic diseases, such as chronic pain, chronic pancreatitis, and cancer. Finally, the author stresses that in the majority of patients video scope procedures provide favourable postoperative quality of life compared to the open surgery [11]. Lachiński et al. [12] present the position that the assessment of quality of life after several years of treatment is not critical for differentiating the results of treatment using open and minimally invasive methods. Quality of life in that period of time is affected by many factors independent from the operation, such as comorbidities, socioeconomic status, and life problems. Quintana et al. [13] analysed clinical material of 6 large hospitals in Spain, where the quality of life parameters were studied before and three months after surgery in groups with clear indications for cholecystectomy. In the group of symptomatic cholelithiasis, after surgery, there was a significant improvement in all parameters in assessing the quality of life. In patients after cholecystectomy, who before surgery did not report pain, quality of life has not changed. This allows the reader to conclude that asymptomatic patients are not good candidates for cholecystectomy, by any method [14].

Nilsson and Ros compared the quality of life in a group of 724 patients treated with cholecystectomy by mini laparotomy with 362 treated laparoscopically. Quality of life was significantly lower in the mini-laparoscopy group in a week after surgery, while after one month and one year after the procedure there were no differences in both groups. Li et al. [15] monitored quality of life 2, 5, 10 and 16 weeks after surgery. The patients were treated for uncomplicated cholelithiasis, 25 were treated laparoscopically and 26 by open surgery. The authors demonstrated that quality of life before surgery in the group operated on laparoscopically was low. Then the patients' emotional state and physical fitness were significantly increased after 2, 5, and 10 weeks after surgery. In the group of patients operated on by the classical method, improvement in quality of life was not observed. 16 weeks after surgery there was no apparent difference in quality of life between the groups [16].

Räsänen assesses the quality of life 4, 6 and 12 months after surgery, stating that an increase was observed in just four months. It shows that in order to assess the full effect of gastroenterological surgery by measuring quality of life we need 12 months [17].

Topçy Ö and Karakaya studied the patients' quality of life for more than three years after the procedure, concluding a better quality of life after laparoscopic cholecystectomy than the classical. The study, however, has met with criticism due to the fact that during a longer observation period a patient's state of health may change due to new illnesses occurring at the time [18].

In some studies of quality of life there was no statistical difference between laparoscopic and open cholecystectomy [18].

## Conclusion

The percentage of continuing abdominal symptoms and their severity during the half-year period after the laparoscopic procedure is comparable with the percentage of symptoms continuing after classical technique treatments. During the postoperative period, better

comfort and higher quality of life are observed in comparison with the preoperational period, especially concerning the patients' physical and mental performance. Despite treatments applied, dyspeptic symptoms continue in some of the patients. Post cholecystectomy syndrome has been observed in 37.2% of the patients following gallbladder removal. PC symptoms were significantly less commonly observed in patients treated with the laparoscopic method. The symptoms of PC were more frequently observed in women than in men.

In patients undergoing laparoscopic surgery higher quality of life was observed after a 6 months follow-up, compared to patients who underwent classic surgery. The level of anxiety of patients after laparoscopic cholecystectomy is lower. After 6 months, patients undergoing laparoscopic surgery were significantly less likely to feel anxious, which was indicated in the STA questionnaire. Patients in the open cholecystectomy group declared, after 6 months, higher quality of life only in the field of social relations.

### Conflicts of interest

The authors declare that they have no conflicts of interest.

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# Upper Digestive Endoscopy Prior to Bariatric Surgery in Morbidly Obese Patients - A Retrospective Analysis

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## Abstract

Obesity has become one of the world's major public health problems. It is now accepted that bariatric surgery is a far better option than nonsurgical treatments for morbid obese patients. Routine upper gastrointestinal (GI) endoscopy as a complementary method for evaluation of bariatric patient's status prior to surgery is still a matter of debate.

**Aim** of the study was to evaluate the importance of routine upper GI endoscopy before bariatric surgery.

**Material and methods:** A clinical retrospective study was carried out on a series of 77 patients referred for bariatric surgery between 2012 and 2015 in our surgical unit. We reviewed the medical records of all patients, endoscopy diagnosis, histopatological reports on gastric endoscopic biopsies and the colonisation with *H. pylori.*

**Result:** The patients in our study had a median age of 39.25 years and a BMI (body mass index) ranging from 33.3 to 60.5 kg/m$^2$ (median of 44.66 kg/m$^2$). Upper GI endoscopy was performed in all patients before bariatric surgery, regardless of upper gastrointestinal simptomatology. Chronic gastritis was found on upper GI endoscopy prior to bariatric surgery in 36.3% of cases and *Helicobacter pylori* infection was identified in 26% of cases. 6.5% of the patients were diagnosed with hiatal hernia, a hyperplastic gastric polyp, a intragastric pancreatic tissue ectopy and a case of gastric cancer were also detected.

**Conclusion:** Although preoperative endoscopy rarely diagnose pathological conditions that may change the surgical approach, we believe that, for a complete work-out of these patients, gastroenterology consultation and upper GI endoscopy should be mandatory prior to bariatric surgery.

**Keywords:** Upper GI endoscopy; Morbid obesity; Bariatric surgery; Gastric cancer

## Background

Obesity has become one of the world's major health issues due to its endemic progression and associated comorbidities. The International Association for the Study of Obesity reported that approximately 40-50% of men and 25-35% of women in the EU were overweight (defined as a BMI between 25.0 and 29.9 kg/m$^2$), and an additional 15-25% of men and 15-25% of women were obese (BMI ≥ 30.0 kg/m$^2$) [1]. Obesity is strongly associated with hypertension, type 2 diabetes or insulin resistance, dyslipidemia, coronary heart disease, nonalcoholic fatty liver disease (ranging from simple steatosis to steatohepatitis, hepatic cirrhosis and end-stage liver disease), hepatocellular carcinoma and multiple other types of cancer, including colonic and gynecological cancers. This is why the treatment of obesity has become one of the major concerns of health systems in the affected areas, including primarily economically developed countries. To date, bariatric surgery is the only treatment that has shown long-term usefulnes. Despite the existing guidelines for the preoperative evaluation of the morbidly obese patients candidates for bariatric surgery, the routine preoperative upper GI endoscopy is still a matter of debate. By analyzing the impact of endoscopic findings on the bariatric surgical management, some authors found that routine preoperative upper endoscopy is not required [2]; however, a study on 212 morbidly obese patients who underwent bariatric procedures showed a high prevalence of gastrointestinal diseases with a significant impact on perioperative management in two thirds of the cases of bariatric patients who underwent preoperative upper GI endoscopy and therefore they recommend routine gastroscopy about 2-4 weeks prior to surgery [3].

## Material and Methods

A clinical prospective study was carried out on a series of 77 patients referred for bariatric surgery between 2012 and 2015 at the IIIrd Surgical Unit, "St Spiridon" Hospital, Iași. We reviewed all medical records focused on BMI, gastrointestinal symptoms, preoperative endoscopy diagnosis, histopatological reports on gastric endoscopic biopsies and the colonisation with *Helicobacter pylori*.

## Results

The patients in our study had a median age of 39.25 years ranging from 22 to 63 years old, and a BMI ranging from 33.3 to 60.5 kg/m$^2$ (median of 44.66 kg/m$^2$). Our patients were offered to bariatric surgery under conditions of failing weight loss or inadequate losing weight after nutritional therapy. The chosen bariatric procedure for all of them was sleeve gastrectomy. In terms of symptomatology, most patients had postprandial mild epigastric pain (43%) and dyspepsia-perceived as postprandial abdominal fullness (39% of cases) with

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38% of these patients having confounding symptoms; 18% of the patients complained of postprandial regurgitation of whom 22% also complained of postprandial abdominal fullness and mild epigastric pain. Upper GI endoscopy was performed routinely before bariatric surgery; there were noted different pathological aspects: chronic gastritis in 36.36% of cases and *Helicobacter pylori* infection in 26% of cases. 6.5% of the patients were diagnosed with small hiatal hernia, a hyperplastic gastric polyp, a case of pancreatic ectopic tissue into the mucosa of the stomach and a case of gastric cancer were also detected (Figure 1). The patient diagnosed with gastric cancer did not present any other complaints besides the described common symptoms and a slight recent weight loss attributed to nutritional regimen. The most important change in terms of treatment management regarded the patient with gastric cancer to whom bariatric surgery was contraindicated and consequently underwent complete oncologic evaluation and afterwards, total gastrectomy with Roux-en-Y esophagojejunal anastomosis. Surgical intervention was delayed only for the patient with pancreatic tissue ectopy who requiered additional preoperative investigations to rule out other pathologic findings; regarding patients diagnosed with small hiatal hernia on GI endoscopy prior to bariatric surgery, there were mild changes in surgical technique, consisting in additional recalibration of the hiatal orifice. As seen in our results, digestive symptoms seem not to be consistent with the observed changes on endoscopy (Table I). The patients diagnosed with *H. pylori* infection received sequential therapy with 5 days of pantoprazole and amoxicillin followed by 5 days of pantoprazole, clarithromycin, and metronidazole.

## Discussion

While the role of upper GI endoscopy in the management of postoperative complications of bariatric surgery is well known and established [4], the usefulness of preoperative routine upper GI endoscopy – regardless of gastrointestinal simptomatology - remains controversial. The patient symptoms and endoscopic findings are not always correlated in morbidly obeses patients. Agreeing with other authors [5] and having our study as support, we believe that the presence of gastrointestinal symptoms in morbid obese patients may be a misleading marker to indicate endoscopy prior to bariatric surgery. On a study of 69 consecutive diagnostic upper GI endoscopies in morbidly obese patients before bariatric procedures, 80% of the patients with pathological findings were asymptomatic, authors concluding that every morbidly obese patient should undergo endoscopy before bariatric surgery [6]. There are many other authors suggesting that preoperative endoscopy should be performed to all patients prior to bariatric surgery because it is useful in detecting both lesions and inflammation and the prevalence of gastrointestinal diseases with a significant impact on perioperative management is high [7-9]. The controversy occurs with other studies on large serial cases, claiming that while abnormalities on preoperative GI endoscopy are often found in patients undergoing bariatric surgery evaluation, rarely do the findings change surgical management [10]. A large European retrospective study on 412 patients undergoing bariatric surgery does not support the performance of routine preoperative GI endoscopy prior to gastric by-pass by comparing the required resources for this investigation and the influence of the findings on the operative plan [11]. Withal, the only study in literature considering also the estimative general cost for a patient undergoing upper GI endoscopy with biopsy under conscious sedation in an ambulatory surgery center concluded that due to rarely changes in surgical management related to endoscopic findings, alternative methods for screening for common GI conditions should be considered in appropriate patients [12]. What do the guidelines say? According to American Society for Metabolic and Bariatric Surgery (ASMBS) guidelines, clinically significant gastrointestinal symptoms should be evaluated before bariatric surgery with imaging studies, upper gastrointestinal series, or endoscopy and routine screening for the presence of *Helicobacter pylori* before bariatric surgery may be considered in high-prevalence areas [13]. The evidence-based guidelines of the European Association for Endoscopic Surgery concluded that upper gastrointestinal endoscopy or upper GI series is advisable for all bariatric procedures, but is strongly recommended for gastric bypass patients [14]. Concerning *Helicobacter pylori* infection, bariatric patients are affected in 23 to 70% of cases [15,16]. The preoperative management of positve H. pylori morbidly obese patients is also a matter of debate. In a retrospective study of 560 patients who underwent laparoscopic Roux-en-Y gastric bypass (LRYGB), the incidence of postoperative marginal ulcers was higher (6.8%) in patients who did not benefit of *Helicobacter pylori* screening and treatment prior to bariatric surgery comparing to the incidence of these complications (2.4%) in patients who were treated for H. pylori infection before surgery [17]. A more

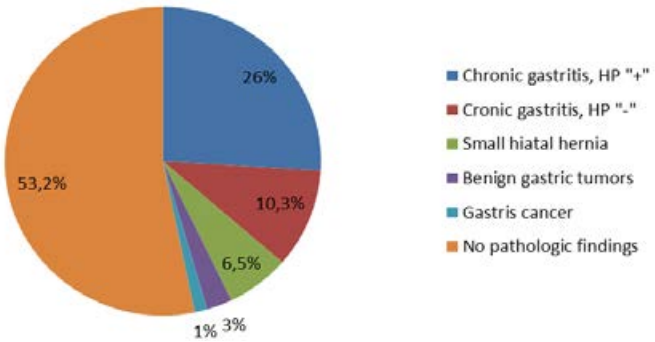


**Figure 1:** Pathological findings in upper GI endoscopy.

**Table I:** Digestive symptoms and endoscopic findings in bariatric patients.

| Postprandial symptoms | Dyspepsia-abdominal fullness | Epigastric pain | Dyspepsia and epigastric pain | Regurgitations | Regurgitations. dyspepsia and pain | No syptoms | Number of patients |
|---|---|---|---|---|---|---|---|
| | n (%) | n (%) | n (%) | n (%) | n (%) | n (%) | n (%) |
| Number of patients | 6 (7.79) | 9 (11.68) | 24 (31.16) | 10 (12.98) | 4 (5.19) | 24 (31.16) | 77 (100) |
| Endoscopy findings: Chronic gastritis. HP "+" | 4 (20) | 2 (10) | 7 (35) | 2 (10) | 0 (0) | 5 (25) | 20 (100) |
| Endoscopy findings: Chronic gastritis. HP"-" | 1 (12.5) | 2 (25) | 3( 37.5) | 0 (0) | 1 (12.5) | 1 (12.5) | 8 (100) |
| Endoscopy findings: small hiatal hernia | 0 (0) | 0 (0) | 1 (20) | 1 (20) | 2 (40) | 1 (20) | 5 (100) |
| Endoscopy findings: benign tumors | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1 (50) | 1(50) | 2 (100) |
| Endoscopy findings: gastric cancer | 1 (100) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 1 (100) |
| No pathological findings on endoscopy | 0 (0) | 5 (12.19) | 13 (31.70) | 7 (17.07) | 0 (0) | 16 (39.02) | 41 (100) |

recent study showed the opposite, pointing out that there is no effect of H. pylori infection on the rates of marginal ulcer or stomal stenosis in patients undergoing LRYGB [18]. Discussing sleeve gastrectomy as an alternative procedure in bariatric surgery, a study on 184 bariatric patients concluded that *Helicobacter pylori* infection seems not to influence postoperative outcome of patients benefiting of laparoscopic sleeve gastrectomy [19]. Because in our group of patients there were no postoperative complications, we can say that *Helicobacter pylori* infection did not affect in any way the immediate postoperative evolution of patients undergoing sleeve gastrectomy.

Obesity is an important risk factor for multiple types of cancer, such as gynecological, renal and digestive malignancies (gallblader, pancreas, esophagus, stomach and colon) [20-23].

Although obesity favors malignancy in different sites, this is the first case of gastric cancer reported in literature as diagnosed by upper GY endoscopy during the preoperative evaluation for patients undergoing bariatric surgery.

## Conclusion

Although preoperative endoscopy rarely diagnose pathological conditions that may change the surgical approach, we believe that, for a complete work-out of these patients, gastroenterology consultation and upper GI endoscopy should be mandatory prior to bariatric surgery.

### Conflict of interest

Authors have no conflict of interest to disclose.

### Acknowledgement

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# Treatment Options in Pipkin Fracture-Dislocation of the Femoral Head: Cases Review

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## Abstract

**Background**: Fractures of the femoral head associated with a hip dislocation are relatively rare and often associated with a poor functional outcome. Materials and methods: In the past two years we had nine cases of femoral head Pipkin fracture-dislocations type I, II and IV. Medical data and radiographs, including computed tomography of the patients were reviewed for analysis. All patients were followed postoperatively for a period of minimum 22 months. Functional outcome was evaluated with the Merle d'Aubigne-Postel score.

**Results**: Of the fractures, four of them were classified as type I Pipkin, of which one was an open type 1 Gustilo-Anderson fracture, two were classified as type II Pipkin, and three were classified as type IV Pipkin. The time from injury to successful closed reduction was 6.7 hours (range 4.5-10 hours). Three type I Pipkin fracture-dislocations were treated by conservative means (no surgery) and one case required excision of intra-articular free bodies. In type II Pipkin fracture-dislocations, open reduction and internal fixation (ORIF) was performed in one case and hemiarthroplasty in the other. In type IV Pipkin lesions, we performed open reduction and internal fixation of the acetabular fracture through posterior Kocher-Langenbeck approach and excision of femoral head intra-articular free bodies The overall outcome was excellent in four cases and good in five cases. Throughout the follow-up period, there was no case of avascular necrosis (AVN) recorded. Heterotopic ossifications (HO) were observed in one case of type I Pipkin, two cases of type II Pipkin and one case of type IV Pipkin fractures.

**Conclusion**: Treatment aim should always be the anatomic reduction of the fragments with minimal soft tissue injury. Sometimes closed reduction is enough, but in the presence of large fragments, the fracture-dislocation is better treated by ORIF. We should not forget that half of these patients will have good outcomes no matter the treatment strategy; this result depends on the general health of the patient, the severity of the injury, associated injuries, associated cartilage injury, and timing of admission to the hospital.

**Keywords:** Hip fracture-dislocation; Pipkin; ORIF

## Introduction

Fractures of the femoral head associated with a hip dislocation are relatively rare and often associated with a poor functional outcome [1]. Keely and Lipscomb reported that the incidence of this type of femoral head fracture is two cases per one million per year [2]. Treatment strategies in femoral head fracture-dislocations are very controversial and represent one of the few true orthopedic emergencies - reduction must be done as soon as possible under general anesthesia with good muscle relaxation to prevent further damage. After reduction, careful examination on multislice computed tomography (CT) should be performed for assessing reduction quality, comminution and free intraarticular fragments [3]. Conservative treatment is accepted only when post-reduction CT demonstrates anatomical reduction [4]. Closed non-surgical treatment can be the best option for Pipkin type I and type II fractures. If closed reduction is not appropriate, open reduction and internal fixation (ORIF) should be the choice of treatment [5]. Type IV Pipkin fractures should be treated surgically by ORIF of the acetabular fracture and fixation or excision of the femoral head fragments. In the past two years, we had nine cases of type I, II and IV Pipkin femoral head fracture-dislocations.

## Materials and Methods

We reviewed nine patients admitted to our emergency department due to femoral head fracture-dislocations between November 2012 and May 2015. Medical data and imaging studies (radiography and CT) of the patients were reviewed for analysis. All patients were followed postoperatively for a period of minimum 12 months (12-26 months). According to Pipkin, femoral head fractures are classified in: Type I - does not involve the weight bearing portion of the femoral head, Type II - involves the weight bearing portion of the femoral head, Type III - type I or II with associated femoral neck fracture and Type IV - type I or II with associated acetabular fracture (usually posterior wall fracture) [6]. Functional outcome was assessed with the Merle d'Aubigne-Postel score [7]. The Merle d'Aubigne-Postel score evaluates hip function taking into account three parameters: pain, mobility and walking, each of them with a maximum score of 6 points. Eighteen points indicate excellent, 15-17 points good, 12-14 points fair, and <12 points poor results. Complications such as heterotopic ossification, avascular necrosis (AVN) and posttraumatic arthritis were also documented.

## Result

Of the fractures, four of them were classified as type I Pipkin, of which one was an open type 1 GustiloAnderson fracture, two were classified as type II Pipkin, and three were classified as type IV Pipkin (Table I).

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**Table I:** Patients detailes.

| Patient/sex/age | Fracture type | Associated lessions | Treatment | Complications | d'Aubigne score |
|---|---|---|---|---|---|
| Case 1/F/69 | Pipkin type I<br>open type 1 Gustilo-Anderson | 42-C2<br>Open type 3B Gustilo-Anderson | Closed reduction | HO | Excelent |
| Case 2/M/ 33 | Pipkin type I | | Closed reduction | | Good |
| Case 3/M/ 31 | Pipkin type I | | Excision of intra-articular free bodies | | Good |
| Case 4/M/34 | Pipkin type II | 13-C3<br>Open type 2 Gustilo-Anderson | ORIF | HO | Good |
| Case 5/F/43 | Pipkin type IV | | ORIF of acetabular fracture + Excision of intra-articular free bodies | | Excelent |
| Case 6/M/65 | Pipkin type II | | Hemiarthroplasty | HO | Excelent |
| Case 7/M/28 | Pipkin type IV | Common peroneal nerve paralysis | ORIF of acetabular fracture + Excision of intra-articular free bodies | | Good |
| Case 8/M/47 | Pipkin type I | | Closed reduction | | Excelent |
| Case 9/M/35 | Pipkin type IV | Common peroneal nerve paralysis | ORIF of acetabular fracture + Excision of intra-articular free bodies | HO | Good |

Two patients were female and seven were male. The average age at the time of injury was 42.7 (28-69) years. Most of the fractures were due to traffic accidents (eight cases), only one patient sustained injury from falling from a height. Immediate closed reduction of the fracture-dislocation of the hip was performed under general or epidural anesthesia in all patients. The average time elapsed from injury to successful closed reduction was 6.7 hours (range 4.5-10 hours). Three of the four type I Pipkin fracture-dislocations were stable with minimum displacement after reduction and were treated conservatively (Figure 1) and one case required surgery that consisted in excision of intra-articular free bodies (Figure 2). In one of the type II Pipkin fracture-dislocations we performed ORIF of the fragment with 3 countersunk screws by Smith-Peterson approach (Figure 3). In the second case, orthopedic reduction was performed per primam (in another department) and after 3 months, when the patient was admitted in our department, we reviewed the post-reduction images and decided to perform a hemiarthroplasty (Figure 4). All type IV Pipkin fracture-dislocations underwent ORIF of the acetabular fracture through posterior Kocher-Langenbeck approach and excision of femoral head intra-articular free bodies (Figure 5). The overall outcome was excellent in four cases (two type I Pipkin, one type II Pipkin and one type IV Pipkin) and good in five cases. Throughout the follow-up period, there was no case of avascular necrosis (AVN) recorded. Heterotopic ossifications (HO) were observed in one case of type I Pipkin, two cases of type II Pipkin and one case of type IV Pipkin fractures.

## Discussion

The time elapsed between traumatic dislocation of the hip joint and reduction of is a key element for a good outcome. Epstein et al. indicated that early reduction (within 24 hours) is associated with better results than late reduction [8]. McMurtry and Quaile [9] showed that the joint should be relocated within 6 hours; failure to do so increases the risk of avascular necrosis of the femoral head. Our study shows that anatomical reduction of dislocation in the first 12 hours of injury is associated with good functional results, only one case requiring hemiarthroplasty following a delayed initial reduction. The size and location of the fractured fragment significantly impacts the outcome. An exact anatomical reconstruction of the femoral head, especially if the weight-bearing part is involved, is absolutely necessary [10]. Patients with type I Pipkin fractures can be treated either by closed reduction or open reduction. If the fragment is large early reduction and internal fixation is recommended in order to produce good results [11]. Regarding the effect of timing of large fragment fixation in patients with type I Pipkin fractures, Lin et al. [12] suggested that surgical reduction and fixation should be performed shortly after injury to improve treatment outcome. For small fragments, surgical fragment excision after closed reduction is an effective treatment for type I Pipkin fractures [13]. For type II Pipkin fractures of the femoral head associated with posterior dislocation of the hip, recommended treatment methods have varied from primary closed reduction to ORIF. Epstein et al. [14] suggested that all traumatic dislocations of the hip must be treated as surgical emergencies and multiple attempts of closed reduction are contraindicated. His studies indicated that results after primary open reduction were better than after closed reduction or after closed reduction followed by open reduction. Butler [15] and Chakraborti [16] suggest that conservative methods should be considered per primam, although treatment of this injury is difficult. The key is to obtain anatomic reduction of all fragments but this is difficult by closed reduction. Henle et al. [4] showed that only 1 in 12 patients obtained an anatomic fracture position after closed reduction; in his study, if the fracture gap within the joint showed a displacement of > 2 mm, operative treatment was indicated to improve reduction. The optimal surgical approach in the treatment of femoral head fractures remains controversial. Some studies advocate the use of Kocher-Langenbeck, others the Smith-Peterson approach or percutaneous fixation after a successful closed reduction [1,8,14,17]. In several cases the femoral head component of the fracture is small and has an infrafoveal location and can either be ignored or simply excised through a Kocher–Langenbeck approach while addressing the posterior wall component. However, when the femoral head component requires fixation, surgical dislocation of the hip allows for simultaneous treatment of both fractures [18]. Solberg et al. [19] reported the outcome of 12 type IV Pipkin fracture-dislocations treated through a surgical hip dislocation. The authors reported a 100% union rate, while only 1 out of 12 patients developed osteonecrosis.

## Conclusion

Treatment aim should always be the anatomic reduction of the fragments with minimal soft tissue injury. Sometimes closed reduction is enough, but in the presence of large fragments, the fracture-dislocation is better treated by ORIF. We should not forget that half of these patients will have good outcomes no matter the treatment strategy; this result depends on the general health of the patient, the severity of the injury, associated injuries, associated cartilage injury, and timing of admission to the hospital.

### Conflict of interest

Authors have no conflict of interests to disclose.

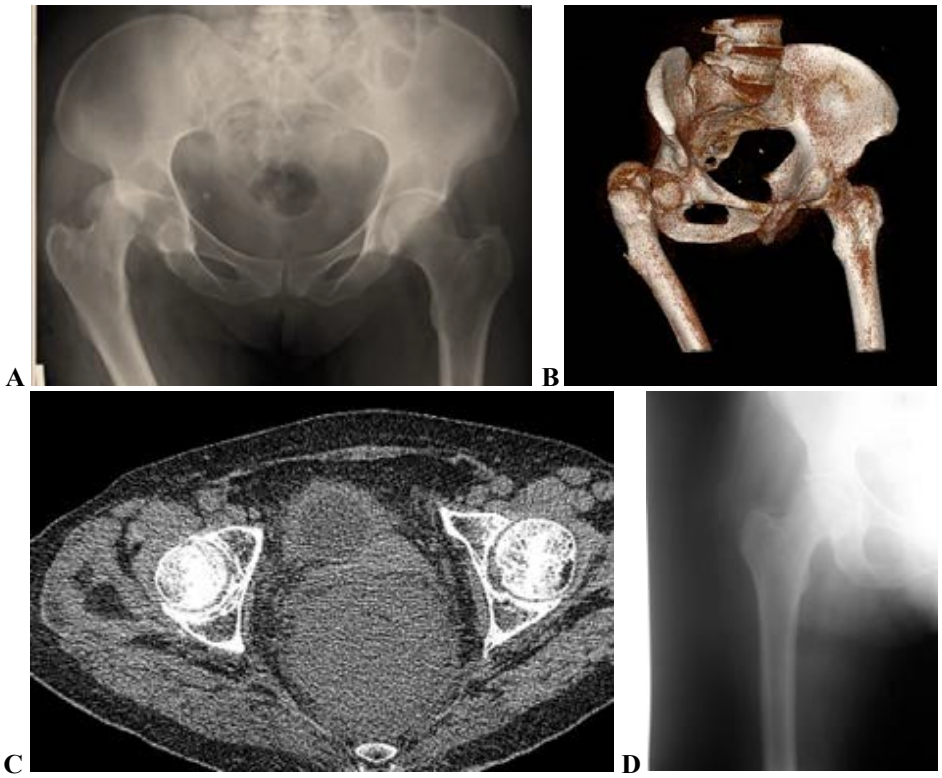


**Figure 1:** 69 years old female patient treated conservatively. Preoperative X-ray (**A**) and 3D CT (**B**) showing postero-superior dislocation of the hip associated with a femoral head fracture inferior to fovea centralis (Pipkin type I). Postreduction CT (**C**) shows anatomical reduction. The patient healed without any complication (**D** – one year follow-up X-ray).

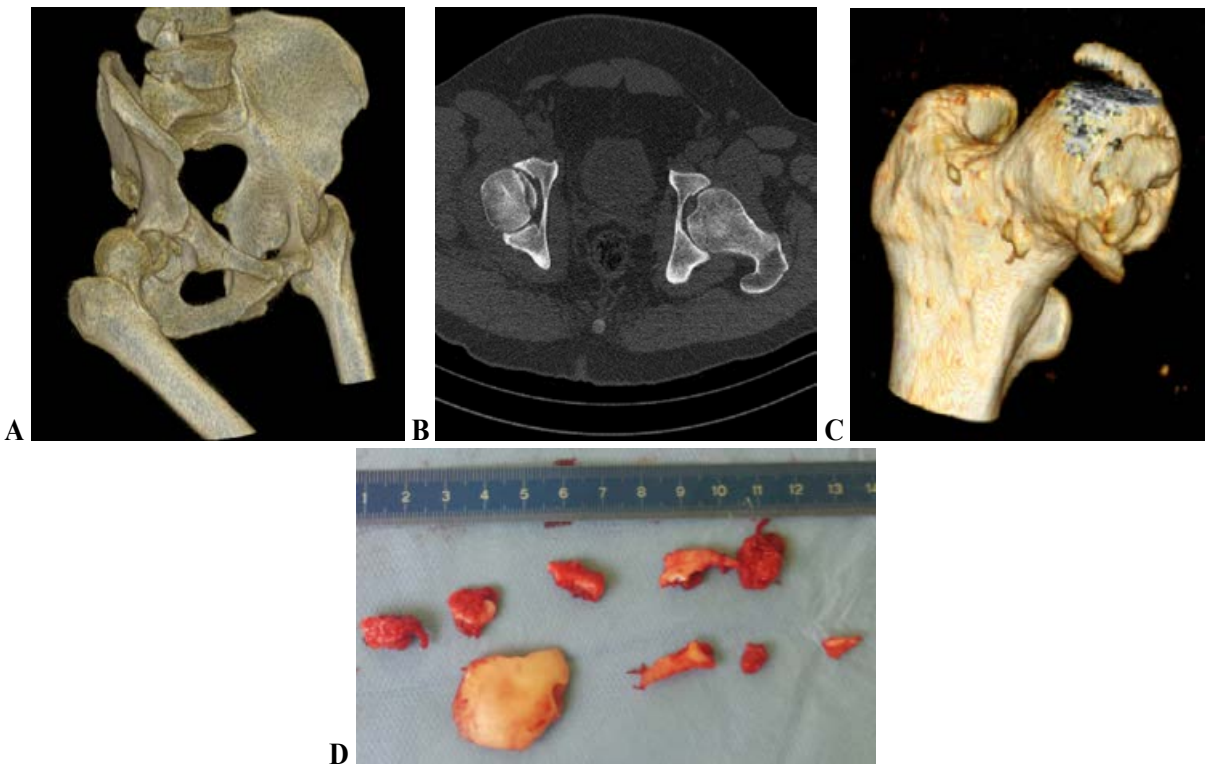


**Figure 2:** 31 years old male patient treated surgical. The initial 3D CT showed postero-superior dislocation of the hip associated with a femoral head fracture inferior to fovea centralis (**A**). After reduction we observed on CT a non-anatomical reduction of the fracture (**B, C**) that required surgery - excision of intra-articular free bodies (D).

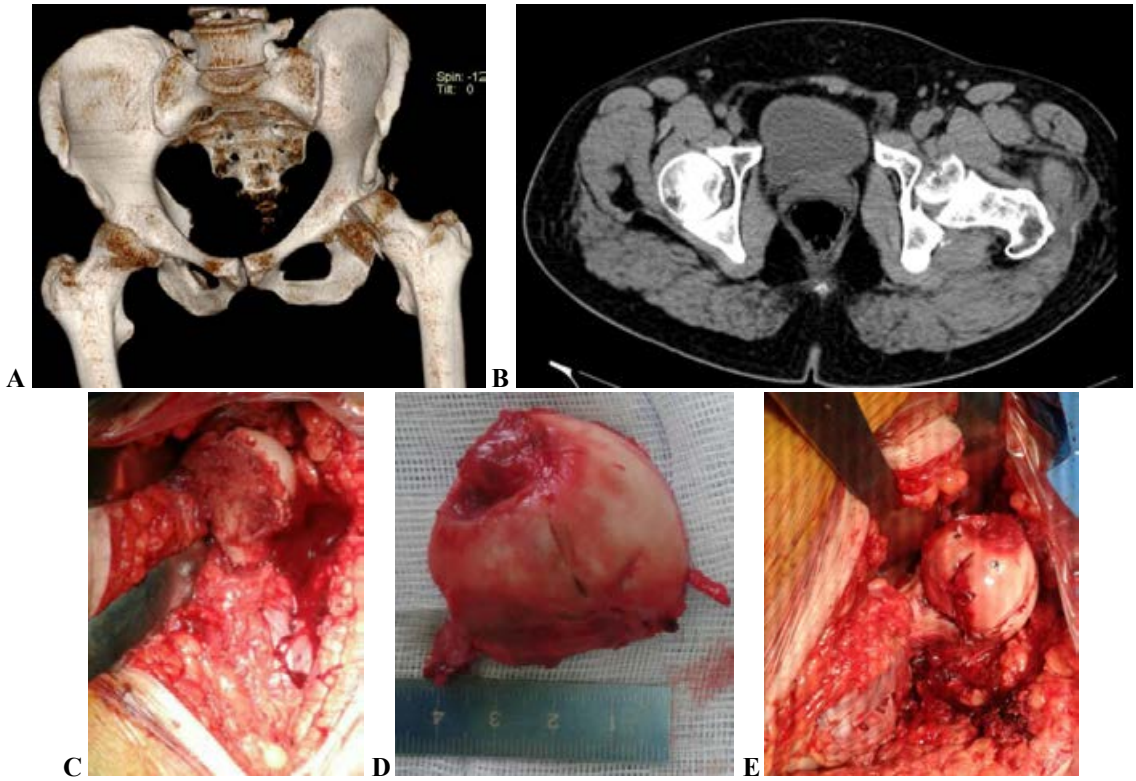

**Figure 3**: 34 years old male patient. After reduction we observed a large femoral head fragment displaced (**A, B**). **C, D** - Intraoperative imagines showing the fracture and the large femoral head fragment. **E** – Intraoperative imagine with fracture reduced and fixated with three countersunk screws.

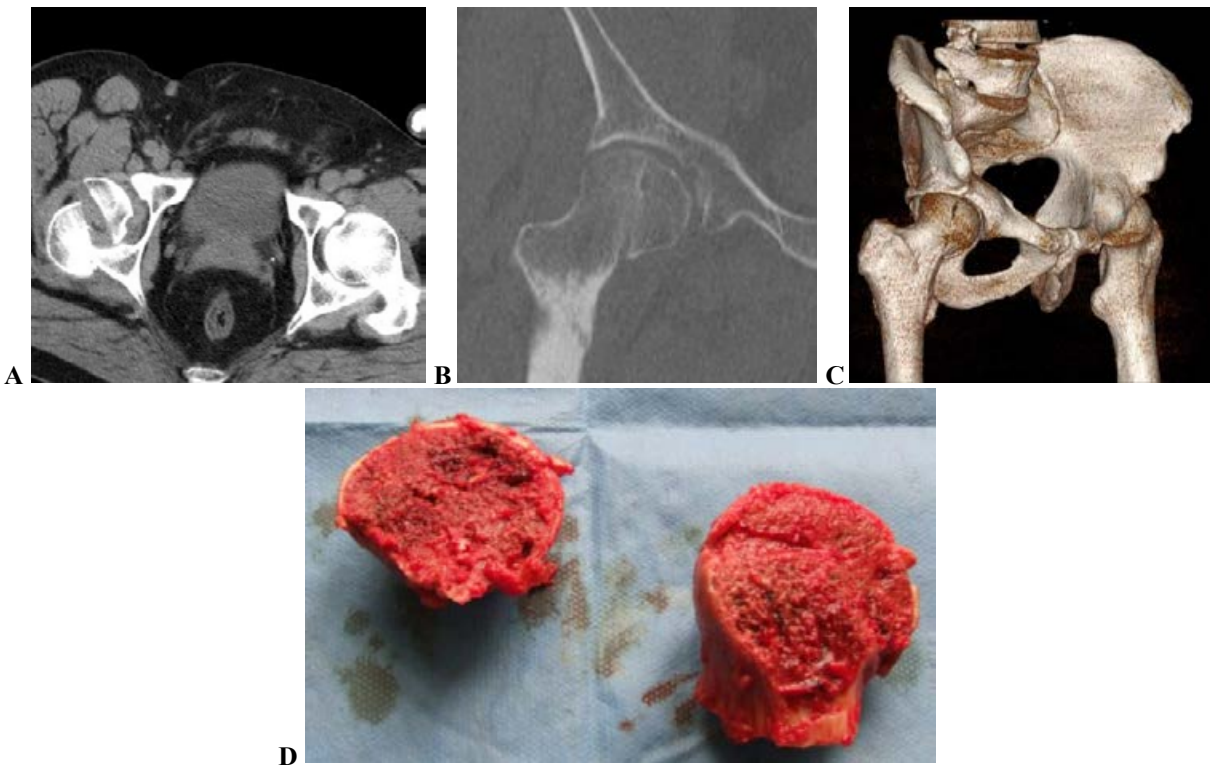

**Figure 4**: 65 years old male patient. The initial CT showed postero-superior dislocation of the hip associated with a femoral head fracture
A)That was treated conservatively in another department. At 3 month the patient come to us with severe pain, CT
B)(**B, C**) showing a non-anatomical reduction (4 mm of displacement). We treated surgically this patient with excellent functional outcome.
C) **D** – Intraoperative imagine showing a fragment almost half of the femoral head so we performed hemiarthroplasty.

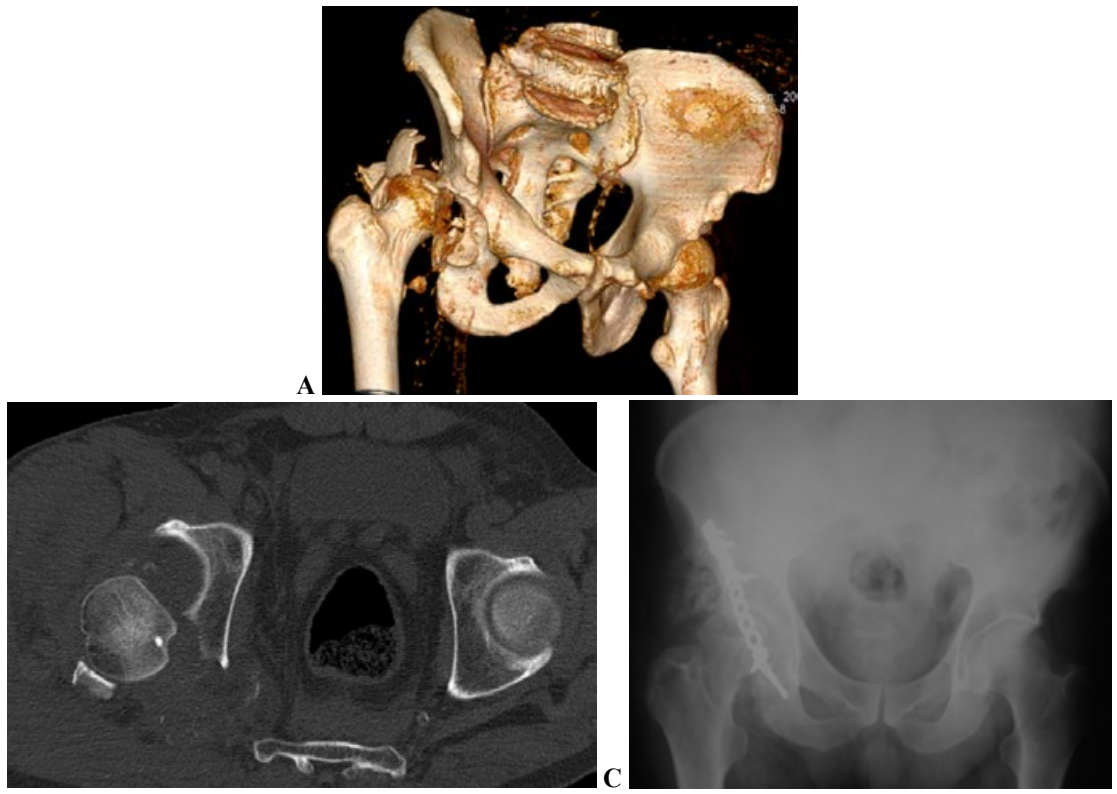


**Figure 5**: 35 years old male patient. The initial CT showed postero-superior dislocation of the hip associated with a femoral head fracture (subfoveal) and posterior acetabular wall fracture – Pipkin type IV
(**A, B**) that was treated surgical - open reduction and internal fixation of the acetabular fracture through posterior Kocher-Langenbeck approach and excision of femoral head intra-articular free bodies.
**C** – six month follow-up X-ray – we observed heterotopic ossifications.

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# Particularities of Primary Breast Cancer in Men.

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## Abstract

**Background**: Breast cancer in men is rare (1% of all breast cancers) and shows some particularities.

**Methods**: We performed a retrospective study analyzing patients admitted and treated in First Surgical Clinic, Emergency Hospital "St. Spiridon" Iasi from 1 January 2008 to 31 December 2015 with malignant breast tumors. Patients included in the study were diagnosed with breast cancer after pathological examination. We followed the clinical data, laboratory and postoperative follow-up of patients.

**Results:** Between 2008 to 2015 in our clinic were treated 319 breast cancers, of which only 11 men, so 3.4%, higher rate to literature data. Most of the patients were aged and with an advance clinical stage. The mean age of men with breast cancer was 67 years, ten years older than women with same disease. The favoring factors in the study group, were: smoking, alcohol consumption in 10 patients, obesity present in 9 patients, blood type IIA, Rh + in 8 patients, periurethral adenoma in 7 patients, diabetes in 6 patients. Neoplastic family histories were recorded in 3 patients, one of Lynch syndrome type II, with BRCA2 mutation. In three cases the breast cancer was the 2nd or 3rd cancer after skin cancer after cancer urothelium and sarcoma soft tissue and in one case with colon cancer, 4 years after breast cancer surgery, with chemotherapy and radiotherapy (Lynch syndrome). We performed: radical mastectomy with axillar lymphadenectomy in 9 cases and whiteout lymphadenectomy (sentinel lymphnode negative) in 2 cases. Median survival was 4.2 years (range 1-8 years).

**Conclusion:** Men have a particular form of breast cancer. Unlike women, this cancer is found in men at an older age, with a higher rate of lymphatic invasion and hormone receptor positivity. Treatment should be personalized by a multidisciplinary team.

**Keywords:** Breast cancer; Mastectomy; Immunohistochemistry

## Introducere

Cancerul mamar la bărbați este rar (1% din toate cancerele de sân și 0.25% din cancerele bărbatului) [1-3]. Se estima în 2015, că 2.350 barbati din SUA vor fi diagnosticați cu cancer de sân și că 440 vor muri prin această boală [1]. Deși primele descrieri clinice s-au făcut în secolul XIV, prima lucrare despre cancerul de sân la bărbat aparține lui J.M. Wainwright în 1926 [cit 3]. Serii peste 100 de cazuri sunt rare în literatură: Scheike O (257 obs în 1973), Treves N (146 obs în 1955) [cit 3], Cardoso F. (1483 obs în 2014) [4]. La noi în țară au publicat cazuri N. Angelescu [5], R. Palade [3], I. Opriș [cit 3], T. Bociat [cit 3], C. Diaconu. Cele mai multe cazuri le înregistrează Institutele Oncologice din Cluj, București, Iași. Raritatea bolii, lipsa unor loturi mari, omogene a făcut ca tratamentul și strategiile de urmarire a acestor pacienți să se inspire din achizițiile impresionante obținute din experiența clinică a cancerului de sân la femei. Totuși cancerul de sân la bărbat are o serie de particularități, pe care dorim să le precizăm în prezentul articol.

## Material și metodă

Am efectuat un studiu retrospectiv analizând pacienții internați și tratați în Clinica I Chirurgie Spitalul Clinic de Urgență „Sf. Spiridon" Iași în perioada 1 ianuarie 2008-31 Decembrie 2015, cu tumori maligne ale sânului. Au fost incluși în studiu bolnavii diagnosticați anatomopatologic cu cancer de sân, care aveau date clinice, paraclinice și de urmărire postoperatorie complete. Deși numărul relativ mic de cazuri nu a permis o interpretare statistică am urmărit să scoatem în evidență particularitățile acestui cancer rar la bărbați.

## Rezultate

În perioada 2008-2015 în clinica noastră au fost tratate 319 cancere mamare, din care doar 11 la bărbați, deci 3.4%, cifră superioară datelor din literatură.Vârsta medie a bărbaților cu cancer de sân a fost de 67 ani, cu zece ani mai mare ca a femeilor cu această boală. Ca factori favorizanți notăm în lotul studiat : fumatul, consumul de alcool la 10 bolnavi, obezitatea prezentă la 9 din 11 bolnavi, grupa de sânge AII+ la 8 bolnavi, adenomul periuretral la 7 bolnavi, diabetul zaharat la 6 bolnavi. Antecedentele familiale neoplazice au fost înregistrate la 3 bolnavi, din care unul cu sindrom Lynch tip II, purtător al mutației BRCA2. La 3 bolnavi, cancerul de sân a fost a 2-a sau a 3-a neoplazie după cancer de piele, după cancer de uroteliu și sarcom părți moi și un caz de noplasm de colon stâng aparut la 4 ani după în cancer de sân operat, chimio- și radiotratat (sindrom Lynch). În general bolnavii studiați aveau între 3 și 10 boli asociate cu o medie de 6 comorbidități. La toate cazurile studiate de noi, debutul bolii a fost insidios (Tabel I).

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De la debutul clinic al afecțiunii până la internarea în spital a trecut un interval între 3 luni și 4 ani , cu o medie de 14.3 luni. Un singur bolnav era purtător al unei tumori benigne mamare de 30 ani, care probabil s-a malignizat. În 7 cazuri tumora era localizată la nivelul sânului stâng și în 4 cazuri pe dreapta. Tabloul clinic la internare a fost reprezentat de o masă tumorală retromamelonară nedureroasă, cu diametru între 1.5 și 6 cm cu o medie de 3.7 cm. Semne locale cutanate și areolo-mamelonare s-au notat în 4 cazuri: tumora ulcerată (tumori peste 4 cm) în 3 cazuri și infiltrarea pielii în alt caz (Figura 1). Într-un caz tumora era fixă pe planurile profunde și în alt caz bolnavul prezenta scurgere mamelonară. În 7 cazuri clinic și ecografic s-au identificat adenopatii axilare, într-un singur caz adenopatii supraclaviculare. Trebuie menționat că, la acești bolnavi diametrul tumoral depășea 4.5 cm. Forma clinică de prezentare a fost cea comună tumorală în 9 cazuri și de ginecomastie în 2 cazuri. Într-un singur caz au existat metastaze pulmonare la internare. Cele 11 cazuri analizate prezentau în momentul internării următoarea stadializare: stadiul II-3 cazuri, stadiul III-7 cazuri, stadiul IV-1 caz. Diagnosticul pozitiv a fost sugerat de anamneză, examenul clinic, argumentat de explorarea prin ecografie Doppler și confirmat de examenul histopatologic la parafină și examen imunhistochimic.Mamografia la bărbat este mai dificil de realizat și am practicat-o la 4 cazuri, după ecografie. Ultrasonografia are o sensibilitate și specificitate de aproape 100% și credem că este metoda de ales în caracterizarea unei mase tumorale la nivelul sânului la bărbat (Figura 2) ; numai în 2 cazuri am bănuit o tumoră benignă, infirmată de examenul histopatologic la parafină. În aceste 2 cazuri am practicat mai întâi tumorectomie și după confirmarea diagnosticului mastectomie Madden cu limfadenectomie axilară. Un singur bolnav a beneficiat de o explorare PET CT. Ca tratament chirurgical am practicat mastectomie radicală + evidare ganglionară axilară la un caz, mastectomie tip Madden cu limfadenectomie axilară la 8 bolnavi și mastectomie simplă cu ganglion santinelă negativ la 2 bolnavi (Tabel II). S-au înregistrat 2 supurații parietale postoperatorii la bolnavi cu chimioterapie preoperatorie sau radioterapie. Au beneficiat de chimioterapie clasică adjuvantă 10 bolnavi și 2 de chimioterapie neoadjuvantă. La 6 bolnavi s-a apelat și la radioterapie. Deoarece majoritatea bolnavilor (N = 9) aveau receptori hormonali pozitivi s-a recomandat tratament supresiv hormonal la 8 cazuri, dar a fost întrerupt pe parcurs la 3 dintre ei. Examenul histopatologic a precizat diagnosticul de carcinom ductal invaziv în 10 cazuri și carcinom mucinos într-un caz (Figura 3). Într-un caz s-a asociat la carcinomul ductal invaziv un papilom intraductal. Gradingul tumoral a fost: G I, 5 cazuri, G II, 4 cazuri și G III, 2 bolnavi. Receptorii HER2 au fost pozitivi la 5 bolnavi. La 6 bolnavi s-a realizat o explorare imunhistochimică completă, care a permis încadrarea în subtipuri moleculare (Figura 4). Un singur bolnav a fost pierdut din evidență după 2 ani. În rest, cei 10 bolnavi sunt în viață între 1 an și 8 ani postoperator cu o medie de 4.2 ani, majoritatea cu profil molecular lemenal B și imunomarcaj difuz la bcl2 (prognostic bun).

## Discuții

Cancerul de sân la sexul masculin este foarte rar (0.2% din toate neoplaziile bărbatului). Incidența cancerul de sân la bărbat crește cu vârsta [3]. Toate cazurile noastre aveau peste 60 ani. Într-un studiu pe 1483 cazuri vârsta medie a fost de 68 ani, mai mare ca la femeile cu cancer de sân [4]. Printre factorii de risc incriminați în apariția cancerului de san la bărbați se menționează mutațiile genetice (mai ales, BRCA2). Cancerul de sân la bărbat este mai frecvent asociat cu prezența unei mutații BRCA2 decât cu prezența unei mutații BRCA1, iar riscurile de cancer de sân pentru purtătorii mutației la bărbați se estimează la 7% ( BRCA2) și respectiv 1% (BRCA1), [4-7]. Se estimează că 75% din bărbații cu mutații ale genei BRCA2 care trec de 70 ani pot dezvolta un cancer mamar, deci BRCA2 poate fi un marker de identificare a acestui risc (3). Mutațiile genei supresoare p53 se corelează cu un prognostic nefavorabil în această boală (3). Alți markeri oncologici asociați cu această neoplazie sunt: oncoproteina c-erb B2,blc-2, pS2, catepsina D, aromataza [3]. Tumorile aneuploide, cu dedublare celulară rapidă au un prognostic evolutiv nefavorabil. În 20% din cazuri există un istoric familial pozitiv de boală [7]. S-au descris în antecedentele heredofamiliale cazuri de neoplasm mamar la un bărbat sau cancer de sân sau ovar la femeile din familie și sindromul Lynch, ca într-unul din cazurile noastre. Etiologia este cel mai probabil hormonală (expunerea la estrogeni). S-a constatat că bărbații cu obezitate în primele decade de viață au un risc mai mare de a dezvolta o tumoră malignă mamară la o vârstă avansată datorită terenului

**Tabel I:** Date clinice ale pacienților.

| Nr. | Vârstă | Interval debut internare, MI | Tumoră (localizare, diam.) | Limfonoduli axilari | Metastaze | Stadiu | Formă clinică | Comorbidități, Obs |
|---|---|---|---|---|---|---|---|---|
| 1 | 72 | 3 luni, crestere in volum | Dr., Central, 3 cm | N0 | M0 | T2,N0,M0, II | ginecomastie | 6, obezitate, gr A II+, VSH+, Fum, Alc. ,HBP |
| 2 | 68 | 2 ani, crestere in volum, ulcerație | Dr. Ginecomastie, 6/4 cm, stg 4 cm,T ulcerată | N3 | Pulm ? | T4,N3,Mx, IV | ginecomastie bilat, T ulcerată | 9, diabet, gr A II+, VSH ++, anemie |
| 3 | 66 | 8 luni | Stg, T 4 cm, multiplu, retromamelonar, | N1 | Mx | T2, N1,Mx, III | tumorală | 9, obezitate, diabet, A II+, VSF +, Fum., Alc,HBP. |
| 4 | 70 | 4 ani, crestere in volum, | Dr.mamelon, ulcerat, 1,5 cm. | No | Mx | T4, N0,Mx, III | ulcerație | 4, obezitate, Fum., Alc. , HBP, A II+ |
| 5 | 75 | 1 an, crestere in volum | Stg.,retromamelonar, 4 cm. | N0 | Mx | T2, N0,M0 | | 6, obezitate, HBP, BIII+ |
| 6 | 56 | 6 luni, crește în volum | Stg, supramamelonar, 3,6 cm, necrozată | N1 | M0 | T4, N1,Mo, III | tum ulcerată | 3, obezitateA II+, Fum., Alc. |
| 7 | 80 | Un an, crește în volum | Stg, retro areolar, 3,5 cm, fixă | N1 | Mx | T2, N1, M0, G1, St III | tumorală | 5, a 3-a neoplazie (uroteliu, sarcom), Fum., Alc, Diabet Zah., OI+, HBP |
| 8 | 63 | Un an, crestere in volum | Stg, retromamelonar, 3 cm | N1 | M0 | T2, N1,M0, III | tumorală | 4, Mama K ovar, sora K san, După 4 ani cancer colon, Sdr. Lynch 2, , obez, diabet zah. OI+ |
| 9 | 60 | 6 luni, tum, secr. mamelon | Stg, retromamelonar, 3 cm | N0 | M0 | T2,N0,M0, st II | tumorală, scurgere | 10, obez, neo cutanat, diabet zah, AII+.,HPB |
| 10 | 59 | Tum mică 30 ani, crește în volum | Dr., 4,5 cm, cu retracție cutanată | N2 | M0 | T4,N2,M0, III | tumorală | 7,AII+, obez, HBP, sora cancer sân |
| 11 | 69 | Tum 1an | Stg. 5 cm, fixă | N1 | M0 | T3N1M0, III | tumorală | 8, obez,diabet, AII+ |

**Figura 1:** Neoplasm mamar la bărbat cu invazia tegumentului (stânga), asociat cu ginecomastie (dreapta).


a)


b)


c)

**Figura 2:** Ecografie mamară și axilară.

a) Retromamelonar drept, nodul solid hipoecogen de 22 x 17 mm, contur boselat, cu microcalcificări, cu discret semnal Doppler în interior. Adiacent un alt nodul hipoecogen de 12 x 8mm.

b) Retromamelonar stâng formațiune solidă neomogenă, bine vascularizată, contur boselat de 36 x 25 mm.

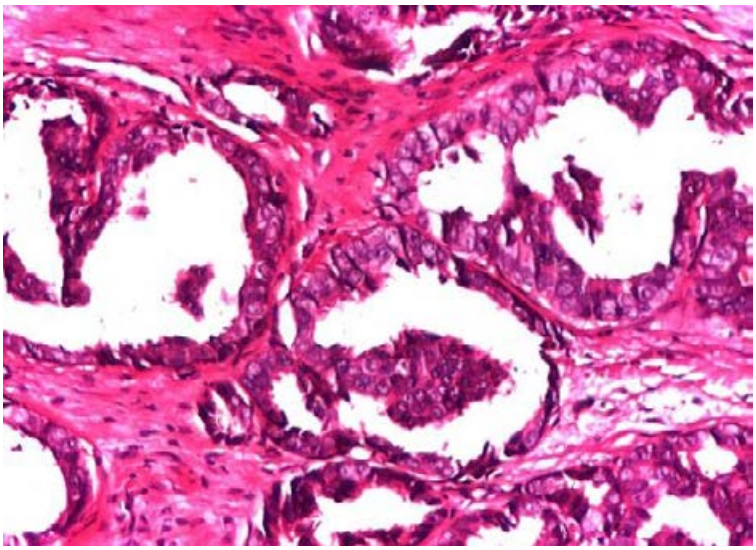
c) Ecografie axilară: adenopatie de aspect tumoral, bine vascularizată, de 13 x 16 mm.

favorabil oferit de țesutul adipos în exces, reprezentat pentru aromatizarea periferică a androgenilor adrenali în estrogeni. Tratamentul cu estrogeni la bărbat poate favoriza apariția cancerului mamar. Alți factori etiologici incriminați sunt: expunerea sânului la radiații ionizante, traumatismele, sindromul Klinefelter, hiperprolactinemia, diabetul zaharat, infecția cu HIV, ginecomastia. Merită de menționat că în spatele unei ginecomastii se poate ascunde un cancer. Într-un studiu anterior din clinica noastră s-au găsit 2 cancere de sân într-un lot de 114 ginecomastii (1.7%) [8]. Supraviețuitorii cu cancer de sân operați, care au primit citostatice, radioterapie, tratament hormonal au riscul de a dezvolta o altă malignitate primară. Cutuli și colab. au raportat că 17% bărbați dintr-un lot de 404 de pacienti cu cancer de sân au dezvoltat mai tarziu cel puțin un alt cancer primar (prostata, pulmonar, colorectal și cancer esofagian) [9]. Masci și colab. au arătat că 18% din bărbații, supravietuitorii de cancer mamar au dezvoltat un al doilea cancer după o perioadă mediană de urmărire de 51.5 luni, cel mai frecvent cancer de prostată (31%) și cancer de colon (19%) [10]. În studiul nostru un singur bolnav a dezvoltat după 4 ani un cancer de colon (sidrom Lynch tip II). Se recomandă ca supraviețuitorii de cancer de sân să fie controlați de două ori pe an în primii 5 ani postoperator și apoi, anual pentru a depista o recidivă sau apariția unui nou cancer [11], mai ales la purtătorii mutației BRCA2. Datorită legăturii puternice dintre mutațiile BRCA2 si cancerul de san la bărbat NCCN recomandă ca toate supravietuitorii de cancer de sân să beneficieze de consiliere genetică și testare pentru aprecierea riscului neoplazic pentru ei și e familia lor [12]. În general bărbații se prezintă mai târziu la medic decât femeile cu cancer de sân. În lotul studiat intervalul de timp între debutul clinic al tumorii și prezentarea la specialist afost de 14.3 luni. Majoritatea tumorilor au localizare retroareolară, zonă care determină mai precoce infiltrarea musculocutanată și adenopatia axilară. Aproximativ 3/4 dintre pacienți se prezintă cu o masă tumorală, restul solicitând consult medical pentru scurgeri mamelonare, deformări mamelonare, ulcerații sau adenopatie axilară. Diametrul tumorii este mai mic la bărbat; în lotul prezentat acesta a variat între1.5 și 6 cm cu o medie de 3.7 cm. Într-un studiu pe 1483 cazuri interesarea limfonodulară axilară a fost de 45%; în lotul nostru adenopatia a fost identificată la 63.6% din bolnavi. Formele clinice descrise în literarură sunt alături de forma tumorală obișnuită: boala Paget a sânului la bărbat, cancerul inflamator, cancerul mamar bilateral, cancerul de sân cu debut adenopatic axilar, cancerul asociat cu ginecomastie. Diagnosticul este paraclinic și apelează la mamografie, ecografie Doppler, tomodensitometrie pentru extensie, biopsie cu examen histopatologic complet inclusiv receptori tumorali, imunhistochimie, citometrie de flux, identificarea markerilor tumorali. Depistarea metastazelor este obligatorie. Fiind un cancer rar nu se vor bește despre screeningul cancerului de sân la bărbat, dar riscul de a dezvolta un cancer la sânul controlateral crește de 30 ori față de populația generală , mai ales la purtătorii de mutații BRCA [4]. Diagnosticul diferențial se face cu ginecomastia care poate fi o capcană, tumorile benigne (adenom, papilom, lipom), rare, boli inflamatorii ale sânului (t.b.c., abces, ectazii ductale), tumori de perete toracic, tumori metastatice la nivelul sânului (prostată, stomac, plămân). Stadializarea TNM este similară cu cea a cancerului de sân la femei și este de obicei mai avansată. In lotul studiat, cele mai multe cazuri (7) aparțin stadiului III. Examenul anatomopatologic constată de obicei un adenocarcinom ductal invaziv (85%), mai rar tumori de tip papilar (într-un procent mai ridicat decât la femei), lobular, medular, mucinos sau diferite tipuri de sarcoame. Majoritatea tumorilor (peste 80%) sunt estrogen-receptor pozitive, iar 70 % progesteron pozitive, dar și androgen pozitive [3]. Tratamentul este multimodal și se face în echipă multidisciplinară și este inspirat din tratamentul cancerului mamar la femei [13]. În boala localizată se recurge la mastectomia radicală modificată ținând cont de interesarea mușchiului pectoral și a limfonodulilor axilari. Radioterapia postoperatorie este indicată atunci

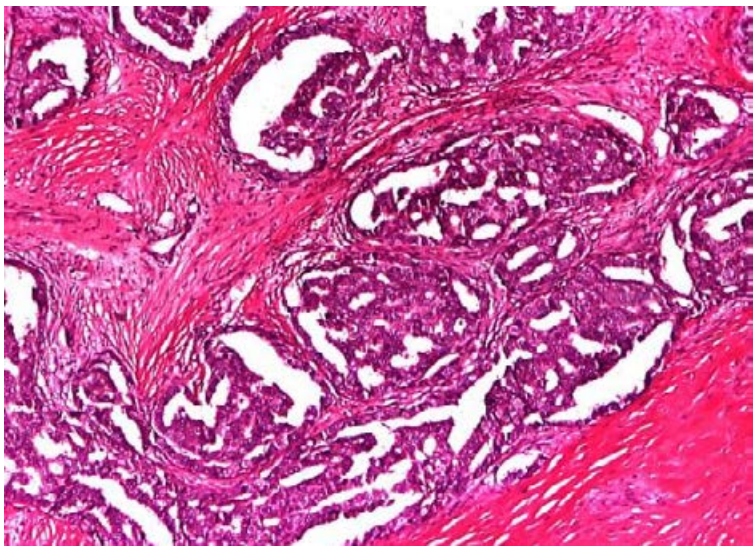
**Tabel II:** Date paraclinice, terapeutice şi rezultate.

| Nr. | Explorari paraclinice | Tratament chirurgical | Chimioterapie | Radioterapie | Tratament hormonal | Dg. Histopatologic | Grading | Receptori | Follow up Ani | Obs |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | EcoDoppler +/- | Excizie Madden + axilă | - | | | Carcinom mucinos | G3, IM 3 | E +, P+ | 8 | Excizie apoi Madden |
| 2 | EcoDoppler + | Op.Madden | + | + | + | Carcinom ductal invaziv | G1 | E+,P+ | 2 | HER 2+ |
| 3 | EcoDoppler+, mamogr. | Mastect rad + axilă, Ext | + | + | + | Carcinom ductal invaziv | G1 | E+,P+ | 7 | |
| 4 | EcoDoppler+, mamogr. | Mastect Madden+ axilă | + | | + | Carcinom ductal invaziv | G2 | E+,P+ | 5 | HER 2 +, supurație plagă |
| 5 | EcoDoppler + | Mastect Madden+ axilă | + | | | Carcinom ductal invaziv | G3, IM 3 | E+,P+ | 5 | HER 2 + |
| 6 | EcoDoppler +. Mamogr+ | Mastectomie totală | + | + | + | Carcinom ductal invaziv, | G2 | E+,P+ | 4 | + Papilom intraductal, HER 2 + |
| 7 | EcoDoppler+ | Mastectomie totală | + | | + | Carcinom ductal invaziv | G1 | E+,P+ | 3 | Ki-67 40%,HER 2 - |
| 8 | EcoDoppler +, PET CT | Mastectomie radicală +axilă | + | + | | Carcinom ductal invaziv | G1 | E+,P+ | 6 | ACE+ Lynch 2 |
| 9 | EcoDoppler + | Mastectomie tot + axilă | + | | + | Carcinom ductal invaziv | G2, IM2 | E+,P+ | 2 | |
| 10 | EcoDoppler - | Tumorectomie, chimio, Madden + axilă | + | + | + | Carcinom ductal invaziv | G2 | E+,P+ | 1 | GeneticHER2+ |
| 11 | EcoDoppler+, mamogr. | Madden + axilă | + | + | + | Carcinom ductal invaziv | G1 | E+,P+ | 1 | Supurație plagă |

a)



b)



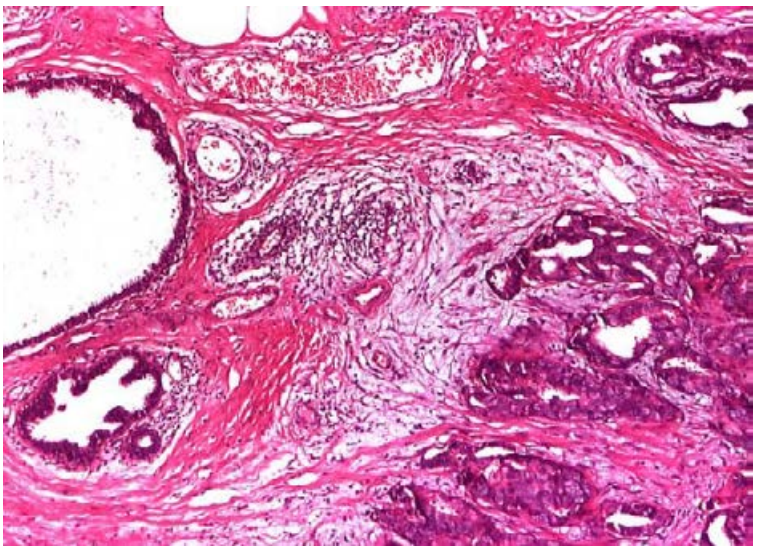
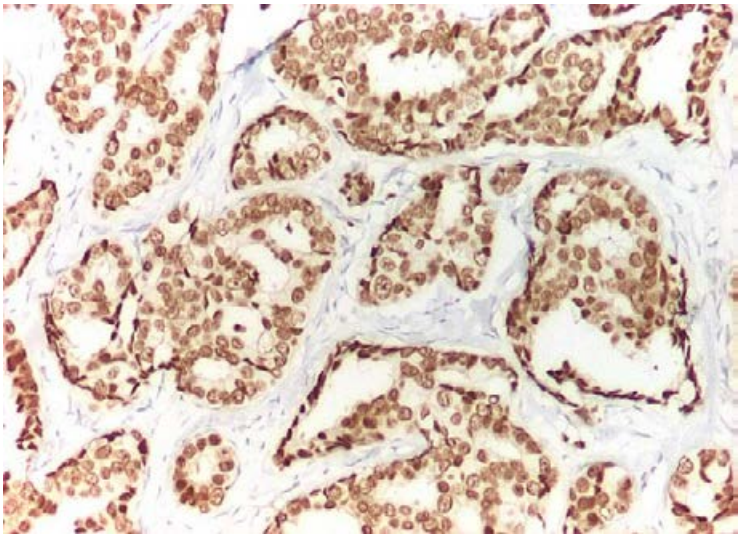
c) 

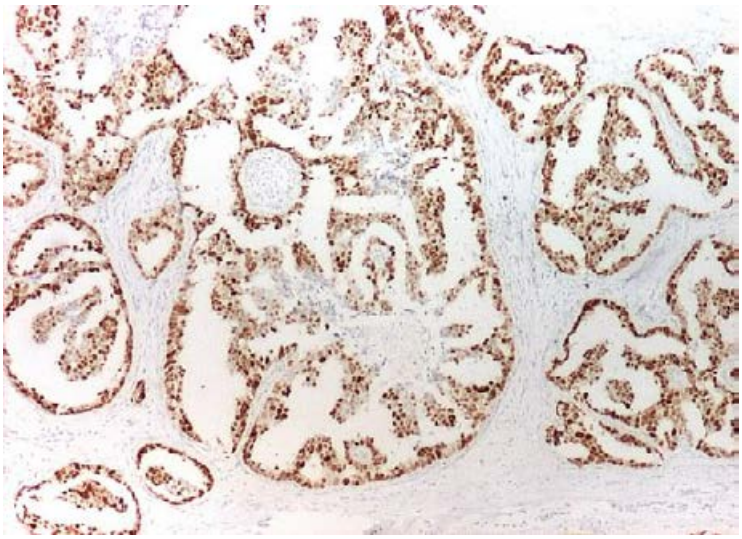
**Figura 3:** Aspecte histologice

a) Carcinom invaziv de glandă mamară tip NST, moderat diferențiat: proliferat tumoral de tip carcinomatos cu arhitectură tubulara și micropapilară, detaliu, x 10, HE.

b) Carcinom invaziv de glandă mamară tip NST, moderat diferențiat: arhitectură cribriformă focală, x 4, HE.

c) Carcinom invaziv de glandă mamară tip NST, moderat diferențiat: țesut glandular restant (stânga) și tumoral (dreapta), x 4, HE.

a) 

b) 

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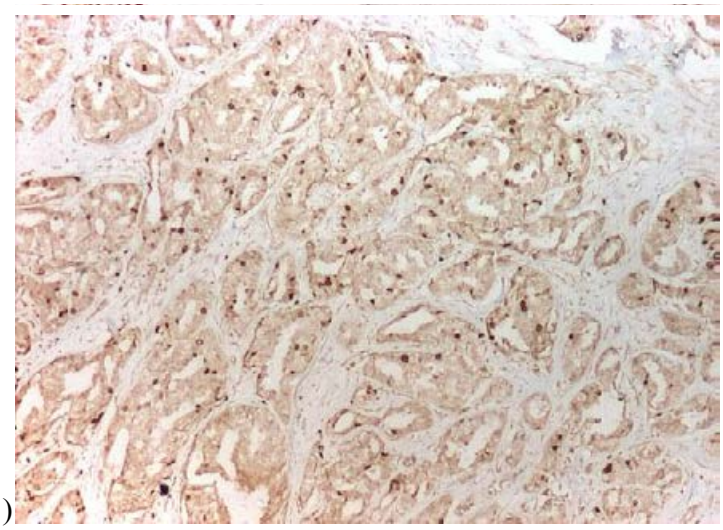
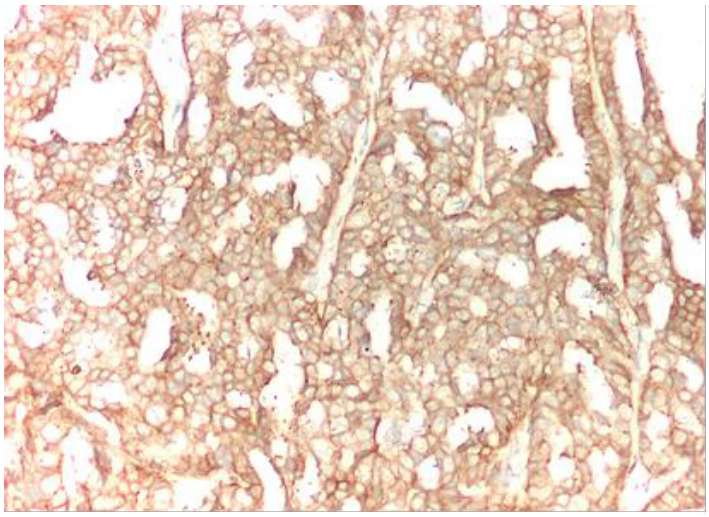


d)



e)

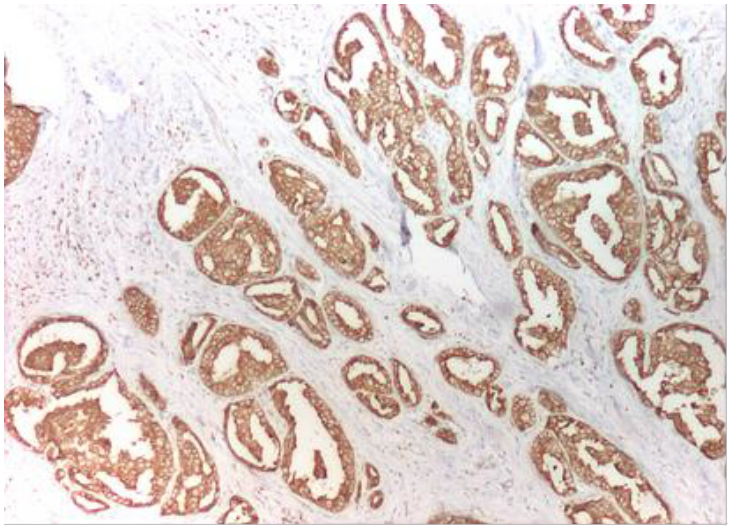


**Figura 4:** Aspecte imunohistochimice:

a) Carcinom invaziv de glandă mamară tip NST, moderat diferenţiat. Imunhistochimie: marcaj pozitiv difuz de intensitate mare în ariile tumorale, x 10, Ac – anti estrogenici.

b) Carcinom invaziv de glandă mamară tip NST, moderat diferenţiat. Imunhistochimie: marcaj pozitiv difuz de intensitate mare în ariile tumorale, x 4, Ac – anti progesteronici.

c) Carcinom invaziv de glandă mamară tip NST, moderat diferenţiat. Imunhistochimie: rata de proliferare redusă, x 4, Ki67.

d) Carcinom invaziv de glandă mamară tip NST, moderat diferenţiat. Imunhistochimie: marcaj difuz membranar de intensitate moderata, x 10, Her 2neu.

e) Carcinom invaziv de glandă mamară tip NST, moderat diferenţiat. Imunhistochimie: marcaj difuz intratumoral, x 4, bcl2.

când se estimează un risc de recidivă locală și in cazul ganglionilor invadați. Mastectomia simplă cu iradiere postoperatorie se însoțește de o rată crescută de recidive locale. Chimioterapia folosește aceleași scheme tarapeutice ca la femei.Desi majoritatea bărbaților cu cancer de sân (peste 70%) primesc terapie hormonală (tamoxifen, inhibitori de aromatază), deoarece tumorile lor au receptori hormonali pozitivi, se adaptează mai greu ca femeile și cel puțin 25% din bărbați întrerup acest tratament ca urmare a efectelor secundare (bufeuri, creșterea în greutate, scaderea libidoului, oboseală, embolie pulmonară, depresie, eruptii cutanate) [14]. Tratamentul cu tamoxifen este considerat un factor de risc pentru apariția accidentelor tromboembolice, care cel puțin teoretic cresc cu vârsta, mai înaintată de regulă la bărbat, fapt ce impune o evaluare atentă a factorilor de risc pentru tromboze și identificarea istoriei familiale pentru trombofilie, înainte de începerea tratamentului hormonal. Expresia receptorilor pentru androgeni în cancerul de sân la bărbat indică un răspuns prost la tratamentul cu tamoxifen [15]. Utilizarea inhibitorilor de aromatază în tratamentul cancerului mamar a fost asociat cu demineralizări osoase și fracturi, de aceea trebuie efectuată osteodensitometrie și administrat suplimente de calciu 1200 mg pe zi și vitamina D3 800-1.000 UI zilnic pentru bolnavii peste 50 de ani. Disfuncția sexuală secundară tratmentului adjuvant este importantă pentru bărbat, care are nevoie de suport psihologic [16, 17]. Asistența psihologică a bărbaților cu cancer de sân și grupurile de suport au aceeași valoare sau poate sunt mai importante ca la femei. O atenție deosebită se impune la începerea tratamentului cu antraciclină și / sau terapii HER2, care pot determina apariția cardiomiopatiei antraciclinice mai ales când există factori de risc: hipertensiune arteriala, dislipidemie, diabet zaharat, antecedente familiale de cardiomiopatie, vârstă peste 65 de ani, fumat, consum de alcool, obezitate, fibrilație atrială, boli coronariene. Pentru a minimaliza acest risc de insuficienta cardiacă progresivă este indicată medicația cardioprotectoare [18, 19]. Supraviețuirea la 5 ani este de aproximativ 80% pentru cazurile în care nu se constată interesarea grupului ganglionar axilar și de doar 30-40% în prezența adenopatiilor axilare. Supravițuirea globală la 10 ani după tratament complex poate ajunge astăzi la 40% [20]. La bolnavii cu metastaze hepatice se indică tratament cu bevacizumb, paclitaxel [21]. Prognosticul este dependent de biologia tumorii, fiind nefavorabil pentru tumorile descoperite în stadii avansate. În evoluția postoperatorie este important subtipul imunhistochimic molecular, tipul lemenal I având un prognostic mai favorabil [22].

## Concluzii

Bărbații fac o formă particulară de cancer mamar; spre deosebire de femei, la bărbați această neoplazie se descoperă la o vârstă înaintată, cu o rată mare de interesare limfonodulară și de pozitivitate a receptorilor hormonali. Tratamentul trebuie personalizat și efectuat în echipă multidisciplinară.

Deși tratamentul complex pluridisciplinar al cancerului de sân la bărbat s-a inspirat din bogata experiență oncologică rezultată din tratamentul cancerului mamar la femei aderența la tratamentul adjuvant este dificilă, necesitând o urmărire atentă și chiar o asistență psihologică atentă, barbați supraviețuitorii de cancer de sân resimțind acest diagnostic ca o mare povară psihosocială. Sunt necesare mai multe studii pentru a defini strategii terapeutice adaptate fiecărui caz.

### Conflict de interese

Autorii nu declară nici un conflict de interese.

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# Laparoscopic Management of Stump Appendicitis after Open Appendectomy

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## Abstract

**Introduction:** Stump appendicitis is a very rare complication after appendectomy with possible serious complications in the absence of a correct diagnosis.

**Case Presentation:** We present the laparoscopic diagnosis and treatment of an extremely rare complication after open appendectomy (remnant stump appendicitis). We report a female patient with a history of open appendectomy performed 7 months ago in another unit. She presented now with persistent typical signs of acute appendicitis, identical with those encountered before the open appendectomy. Repeated US and CT scans were normal. Due to the persistent complaints, a decision for exploratory laparoscopy was made. Intra-operatively we found some adhesions in the right iliac fossa and a 20 mm length appendicular stump which was adherent to the anterior abdominal wall. The stump was dissected, ligated at the base and removed using a 3 trocars approach and standard laparoscopy instruments. The postoperative course was favorable, resolution of the pain and no recurrence at a 3 years follow-up. The pathologic examination showed the typical histologic structure of an inflamed appendix.

**Discussions:** The diagnostic of stump appendicitis is a difficult one in the absence of a high index of suspicion. The case is interesting due to the rarity and the use of a laparoscopic approach to treat an incomplete open appendectomy.

**Conclusions:** Laparoscopy is useful in patients with persistent abdominal symptoms after open appendectomy. If an appendicular stump is present, it allows its identification and safe removal.

**Keywords:** Stump appendicitis; Appendectomy; Laparoscopy

## Introduction

Appendicitis is a common disease with a highly standardised and simple treatment; however, in certain circumstances, its management may involve serious difficulties [1-3]. Stump appendicitis is a very rare complication of appendectomy that requires a reoperation and complete removal of the appendix [4,5]. We present a case of stump apendicitis after open appendectomy removed using a laparoscopic approach.

## Case Presentation

We report a 41 years old female patient with a history of open appendectomy performed 7 months ago. According to the information gathered from the patient and the available medical records, it was a difficult open appendectomy that lasted 2.5 hours, performed for a gangrenous appendicitis with localized peritonitis. The patient received intravenous antibiotics for 7 days, being discharged on postoperative day 8. She presented now with persistent typical signs of appendicitis, identical with those encountered before the open appendectomy. At local examination, a healed 7 cm length scar was noted in the right iliac fossa, corresponding to a typical McBurney incision (Figure 1). Repeated US and CT scans were normal.

Due to the persistent complaints, a decision for exploratory laparoscopy was made (Figure 1). During the dissection of the adhesions from the right iliac fossa we found a 20 mm length appendicular stump whose tip was adherent to the anterior abdominal wall in the area of the scar from previous surgery, corresponding to the preoperative location of the pain. The stump was dissected with a hook and monopolar cautery, ligated at the base and removed using a 3 trocars approach and standard laparoscopy instruments. A left 20 mm diameter ovarian cyst with hemorrhagic content was also discovered and removed (Figures 2 and 3). The duration of the procedure was 90 minutes.

The postoperative course was favorable, with regain of transit after 24 hours and discharge after 4 days. The pathologic examination showed the typical histologic structure of an inflamed appendix (Figure 4). The complaints of the patient disappeared immediately after surgery, with no recurrence at a 3 years follow-up.

## Discussions

The first case of stump appendicitis was published by Rose [6] in 1945, so at almost 50 years after this procedure has become widely accepted as the treatment of choice for acute appendicitis. The exact incidence of this complication is not known and many cases are probably not reported; however, in the published literature there are only case-reports and reviews. In a review of the English literature, Subramanian and Liang found only 61 cases, which demonstrates an obvious low incidence [7].

The main difficuly is the corect diagnosis [1,4,5]. Although many cases (including the one presented by us) may present with suggestive clinical signs, the diagnosis of appendicitis after appendectomy is difficult to accept by both the patient and the surgeon, which leads to a late diagnosis and an increased rate of complications [8]. As

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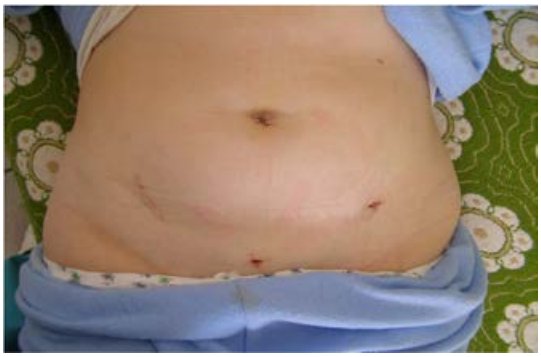

**Figure 1:** Aspect of the abdomen of the patient showing the healed open appendectomy scar and the recently scars from the 3 trocars used to remove the appendicular stump using a laparoscopic approach.

**Figure 2:** Operative specimens – macroscopic aspect.

**Figure 3:** Macroscopic detail of the removed appendicular stump showing a clear lumen.

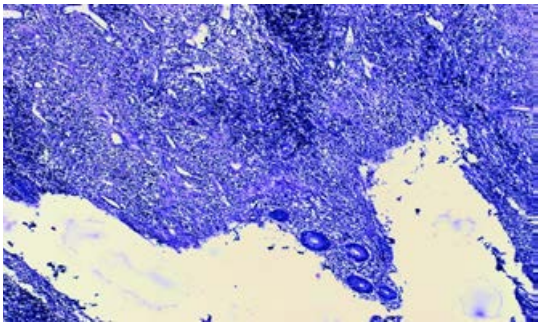

**Figure 4:** Microscopic aspect showing the typical structure of an inflamed appendix (H-E 20X).

demonstrated by our case, a high index of suspicion is the key to the early diagnosis of this entity [9]. In our patient, the exploratory laparoscopy proved to be a both diagnostic and therapeutic tool, allowing an effective management before the ocurrence of other complications.

Based on some case-reports, some authors suggest that this complication occurs more often after laparoscopic appendectomy due to the absence of a three dimensional field and the absence of tactile perception [10,11]. Although a steady statistical analysis is difficult to perform due to the rarity of this complication, the published reviews showed that this complication occurs after both laparoscopic and open appendectomy [4,8,12]. In fact, the laparoscopic approach is associated with a better visualisation due to the magnification. The key for preventing this complication is a clear visualisation of the base of the appendix [13]. In our case, laparoscopy was used to diagnose and treat a complication of open appendectomy.

## Conclusions

The case is interesting due to the rarity and the use of the laparoscopic approach for the diagnosis and removal of the remnant appendicular stump after an open appendectomy. Laparoscopy is useful in patients with persistent abdominal symptoms after appendectomy. If an appendicular stump is present, it allows both an early diagnosis before the occurrence of other complications and its safe removal.

## Conflicts of interest

The authors declare that they have no conflicts of interest.

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# Partial Sternotomy – Useful Approach for Mediastinal Ectopic Parathyroid Adenoma: Case Report and Literature Review

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**Abstract**

Among failed parathyroidectomy causes an important role is played by glandular ectopies, encountered in approximately 20% of cases; in 2% of cases they are localized in the mediastinum. In this latter situation there is a need for a thoracic approach which may be either classical or minimally invasive. The minimally invasive surgery is appealing and the results surpass those of classical surgery. Nevertheless, there are situations in which minimally invasive surgery is inefficient, not indicated, or unaffordable, thus, the classical approach remains the only option for surgical treatment. Partial sternotomy could represent a good alternative to classical full sternotomy or thoracotomy. We present the case of a hemodialysed patient with secondary persistent hyperparathyroidism after two failed parathyroidectomies; localization studies identified an ectopic hyperfunctional mediastinal parathyroid gland which was excised through a partial sternotomy. To the best of our knowledge, this is the first case reported in Romanian literature which describes this kind of approach for a mediastinal ectopic parathyroid gland.

**Keywords:** Partial sternotomy; Mediastinal adenoma; Secondary hyperparathyroidism; Parathyroidectomy

## Introducere

Printre cauzele unei paratiroidectomii nereușite un loc important îl ocupă ectopiile glandulare, întalnite în aprox 20% din cazuri și în general atribuite unor vicii de migrare embriologică [1]. Aceste glande ectopice pot fi localizate divers: de ex. retroesofagian, timus cervical, retrovascular; în 2% din cazuri glandele hiperactive sunt localizate în mediastin [2]. Majoritatea ectopiilor mediastinale pot fi abordate pe cale cervicală, fiind localizate accesibil, în mediastinul antero-superior [3]. În unele cazuri glandele ectopice sunt situate inferior de vena brahiocefalică, pentru rezectia lor fiind necesar un abord toracic; acesta poate fi clasic prin toracotomie sau sternotomie sau mai nou minim invaziv, videoasistat sau robotic [4]. Abordul minim invaziv este seducător iar rezultatele raportate sunt superioare chirurgiei clasice [4,5]; există însă situații în care chirurgia minim-invazivă este ineficientă, neindicată sau inaccesibilă astfel încât toracotomia și/sau sternotomia rămân singurele variante de tratament chirurgical [6].

Prezentăm cazul unui pacient hemodializat, cu hiperparatiroidism secundar refractar persistent în urma a două tentative de paratiroidectomie totală, la care studiile de localizare au identificat un adenom paratiroidian mediastinal care a fost abordat printr-o sternotomie parțială. Din câte cunoaștem acesta este primul caz raportat în literatura autohtonă în care se descrie un astfel de abord pentru rezectia unei glande paratiroide mediastinale hiperfuncționale din cadrul hiperparatiroidismului secundar de origine renală.

## Prezentare de caz

Pacientul este un bărbat în vârstă de 52 de ani, inclus de peste 15 ani în programul de hemodializă datorită insuficienței renale cronice stadiul V, secundare unei glomerulonefrite cronice; acesta se internează în serviciul nostru pentru tratamentul chirurgical al unui hiperparatiroidism secundar persistent.

Pacientul a fost diagnosticat cu hiperparatiroidism secundar sever în urmă cu 7 ani, prezentând dureri osteoarticulare, astenie musculară pronunțată, ulterior deformări osoase ce interesau în primul rând coloana vertebrală, prurit rebel; retrospectiv, din datele de laborator, se remarcă valorile crescute ale parathormonului seric, hiperfosfatemie, creșterea moderată a fosfatazei alcaline serice. În toată această perioadă a fost tratat conservator cu analogi ai vitaminei D, biofosfonați iar în ultima perioadă calcimimetice. Cu 5 ani înaintea acestei ultime internări s-a efectuat o primă tentativă de paratiroidectomie într-un alt centru chirurgical; laboratorul înaintea acestei intervenții evidenția valori crescute ale parathormonului seric (iPth: 1612 pg/mL, VN: 15-68 pg/mL), ușoară hipercalcemie și hiperfosfatemie severă (P: 7,45mg/dL, VN: 2.5-4.7 mg/dL). Așa cum reiese din buletinul de analiză histopatologică, în timpul acestei intervenții chirurgicale au fost descoperite și excizate două glande paratiroide (dreaptă inferioară și stângă superioară), operația finalizându-se în aceste condiții (evident), fără autoimplant paratiroidian. Pacientul rămâne după intervenție cu un hiperaparatiroidism persistent, valorile iPth seric fiind repetat situate în următoarele luni între 1880-2110 pg/mL; datele de laborator înregistrate după această primă operație, dar și cele notate după celelalte intervenții sunt precizate în Tabelul I.

După această primă tentativă de paratiroidectomie pacientul a fost explorat imagistic (doar ecografic!!) iar după 4 luni a fost supus unei alte operații cervicale; în cursul acestei reintervenții a fost descoperită și rezecată o altă paratiroidă hiperfuncțională, fără a fi precizată poziția acesteia. Cu toate acestea pacientul rămâne și de aceasta dată cu un hiperaparatiroidism persistent postoperator, confirmat biochimic (Tabel I).

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**Tabel I:** Datele de laborator după cele trei intervenții chirurgicale.

| Variabile | Operația 1 | Operația 2 | Operația 3 |
|---|---|---|---|
| iPth (pg/mL) | 1880 | 2513 | 3 |
| Ca (mg/dL) | 9.15 | 9.02 | 7.60 |
| P (mg/dL) | 7.36 | 6.47 | 3.78 |

iPth= parathormon seric; Ca= calcemie; P= fosfatemie

În perioada următoare s-a instituit un tratament conservator, cazul fiind adresat clinicii noastre. Am efectuat anumite studii imagistice de localizare; scintigrafia cu Tc 99 methoxyisobutyl isonitril ($^{99}$Tc-MIBI) a arătat o captare crescută a radiotrasorului în regiunea mediastinală anterioară, compatibilă cu un adenom paratiroidian mediastinal hiperfuncțional (Figura 1). Rezonanța magnetică cervico-toracică a descris o masă omogenă (26 x 16 x 17 mm), localizată prevascular, în mediastinul anterior, corespunzător imaginii scintigrafice (Figura 2).

Ținând cont de poziția intratoracică a glandei ectopice, ce nu oferea șansa unei rezecții pe cale cervicală și fără posibilitatea unui abord minim invaziv, am decis paratiroidectomia printr-o sternotomie parțială. Aceasta s-a efectuat cu ajutorul unui sternotom portabil pneumatic, de la nivelul incizurii manubriului sternal până la nivelul spațiului intercostal III; polul inferior al sternotomiei a fost extins lateral către ambele spații intercostale (III), aceasta având în final forma unui "T" inversat (Figura 3). Hemostaza sternală a fost realizată prin electrocoagulare și ceară de os iar câmpul operator a fost menținut cu ajutorul unui depărtător tip Weitlaner. Explorarea mediastinului superior a evidențiat o paratiroidă ectopică (21 x 15 x 11 mm) situată prevascular, sub nivelul venei nenumite, glandă ce a fost excizată după ligatura pedicolului său vascular (Figura 4).

Sternul a fost închis cu ajutorul a două fire de oțel, plasate astfel încât să evite leziunea arterei mamare interne. Firul superior a fost plasat prin grosimea manubriului sternal iar cel inferior a fost poziționat oblic, pentru a solidariza extinderile laterale ale sternotomiei. Drenajul mediastinal s-a exteriorizat pe cale cervicală (Figura 5, 6).

Operația a durat 85 de minute, decurgând fără incidente; nu s-au înregistrat complicații postoperatorii, pacientul fiind dializat în prima zi postoperator și externat după 7 zile, sub tratament substitutiv cu preparate de calciu oral și vitamin D. Dozarea iPth-ului la 24 de ore de la intervenție a evidențiat o valoare de 3 pg/mL (VN:15-68pg/mL) confirmând eficacitatea paratiroidectomiei; examinarea histopatologică a notat ulterior hiperplazia paratiroidiană. Revăzut la 6 luni și ulterior un an postoperator, pacientul prezintă o stare general bună, simptomatologia este semnificativ ameliorată, persistând o ușoară hipocalcemie cu valori normale ale fosforului și iPth ului seric. S-a obținut acordul pentru publicarea acestui caz.

## Discuții

Ectopiile glandelor paratiroide se întâlnesc în 25% din cazuri [7], atât în hiperparatiroidismul primar cât și în cel secundar și constituie cea mai frecventă cauză a unei paratiroidectomii nereușite [1]. Între numeroasele localizări ectopice un loc aparte îl ocupă cele mediastinale; majoritatea acestor adenoame/paratiroide hiperfuncționale sunt localizate în mediastinul antero-superior, rezecția lor fiind posibilă prin abordul clasic cervical anterior, eventual extins printr-o "branșare" caudală a acestuia [8]. În 2% din cazuri paratiroidele ectopice sunt situate profund în mediastin, sub nivelul venei brahio-cefalice, considerat a fi limita inferioară a posibilităților de rezecție pe cale cervicală; aceste cazuri impun o explorare mediastinală, ce se realizează clasic prin toracotomie sau sternotomie [9].

Toracotomii sau sternotomii pentru excizia adenoamelor ectopice mediastinale au fost descrise în repetate rânduri în literatura ultimilor 20 de ani [7,10],acestui abord clasic fiindu-i asociată o rată de success în identificarea glandei hiperfuncționale ectopice cuprinsă între 64-100% [6,10,11]. Morbiditatea postoperatorie după astfel de intervenții este însă specifică chirurgiei toracice sau cardiace și deloc neglijabilă, uneori de până la 29% [6,12]. Dezvoltarea metodelor imagistice de localizare a adenoamelor paratiroidiene, în mod deosebit a scintigrafiei MIBI și a ecografiei de înaltă rezoluție, a deschis calea chirurgiei minim invasive paratiroidiene cervicale; transpunerea acestor tehnologii și în exporarea adenoamelor mediastinale a permis introducerea unor tehnici minim-invaze și pentru excizia ectopiilor mediastinale, în speță chirurgia toracică video-asistată (engl. video-assisted thoracic surgery, VATS) sau abordul robotic. Deși seducatoare, este evident că acestea necesită, pe lângă o dotare superioară cu aparatură și cunoștințe de chirurgie toracică minim invazivă, respectiv o curbă de învățare nu întotdeauna accesibilă chirurgului generalist sau endocrin.

Sternoromia parțială a fost descrisă inițial ca abord clasic mai puțin invaziv în chirurgia cardiacă, pentru înlocuiri valvulare mitrale și aortice, defecte septale, chiar anumite reintervenții [13]; tehnica este mai puțin cunoscută în chirurgia endocrină, deși unii autori o recomandă [6]. Cazul prezentat descrie un astfel de abord la un pacient hemodializat, după două tentative nereușite de paratiroidectomie prin abord cervical; din cate cunoastem este primul caz publicat în literatura autohtonă ce a beneficiat de o astfel de abordare chirurgicală.

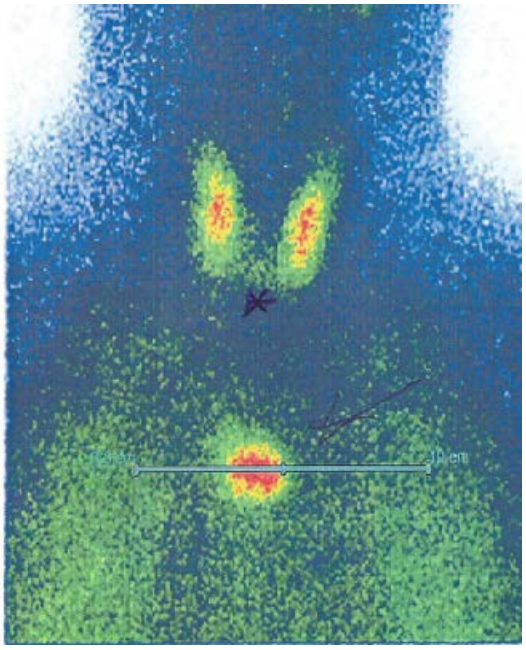

**Figura 1:** Studii de localizare paratiroidiană - scintigrafie $^{99}$Tc-MIBI: captare crescută a radiotrasorului în regiunea mediastinală anterioară, compatibilă cu un adenom paratiroidian mediastinal hiperfuncțional.

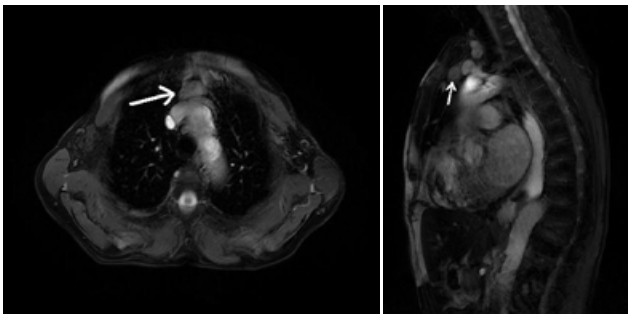

**Figura 2:** Studii de localizare paratiroidiană – IRM cervico-toracic (secțiune coronală și sagitală): masă tisulară de 26 x 16 x 17 mm), localizată în mediastinul anterior.

**Figura 3:** Aspecte per operatorii - sternotomia partial.

**Figura 4:** Aspecte peroperatorii -paratiroida mediastinală.

**Figura 5:** Aspecte per operatorii - închiderea sternotomiei parțiale: plasarea firelor sternale.

**Figura 6:** Aspecte per operatorii - închiderea sternotomiei parțiale: aspect final.

Sternotomia parțială se efectuează strict pe linia mediană, de la nivelul incizurii sternale până la nivelul celui de-al treilea spațiu intercostal, de unde poate fi extinsă uni sau bilateral, în "L", "J" sau "T inversat" [6,13]; la cazul prezentat am preferat ultima variantă pentru o expunere superioară a mediastinului anterior. Majoritatea autorilor precizează că efectuată în această manieră incizia s-a dovedit suficientă pentru excizia paratiroidelor mediastinale, rata de success a operației fiind similară cu cea descrisă prin abordul clasic prin toracotomie sau sternotomie completă [1,6,14]. Medrano și colab, [8] raportatează o serie mică de paratiroidectomii prin abord toracoscopic, în care toate paratiroidele ectopice mediastinale au fost găsite în proximitatea timusului, fie intratimic sau paratimic, notând că această relație anatomică este explicabilă prin originea embriologică comună a paratiroidelor inferioare și a timusului din a treia pungă branhială. Noi nu am observat această relație anatomică la cazul operat, unde paratiroida ectopică a fost descoperită imediat inferior de vena brahiocefalică, complet separată de timus. Un aspect ce merită menționat se referă la modalitatea de închidere a sternotomiei; noi am preferat plasarea unui fir sternal inferior în manieră oblică, pentru o mai bună fixare a extensiilor laterale ale sternotomiei, observatie notată și de Bennet și colab [6]. O particularitate a cazului prezentat a fost si osteoporoza severă, în contextul hiperparatiroidismului renal, sternul fiind extrem de fragil și solicitând o atenție sporită la închiderea sternotomiei. Avantajele sternoromiei parțiale sunt numeroase și sunt descrise pe larg în seriile raportate în chirurgia cardiac: de ex. scurtarea timpului operator și a pierderilor sanguine, reducerea spitalizarii, reducerea durerilor și a complicatiilor, în primul rând a temutei dehiscențe sternale după sternotomia clasică [13].

Unii autori descriu alternative ale sternotomiei parțiale; Ravipati și colab. utilizează un abord parasternal, prin rezectia unor cartilaje costale, tehnică ce limitează totuși posibilitățile de explorare a întregului mediastin anterior [15]. Alți autori "forțează" excizia adenoamelor mediastinale prin abordul cervical, ajutându-se pentru aceasta de anumite depărtatoare sternale improvizate [16].

## Concluzii

Se poate afirma că sternotomia parțială rămâne o variantă tehnică mai puțin invazivă a stenotomiei sau toracotomiei clasice, pentru excizia ectopiilor mediastinale "adevarate", in situatia în care tehnicile modern (de ex.VATS sau chirurgia robotică) nu sunt indicate sau sunt inaccesibile; în toate cazurile localizarea preoperatorie a glandei hiperfuncționale prin studii imagistice este obligatorie.

### Conflict de interese

Autorii nu declară niciun conflict de interese.

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