

# Local Resections and Prosthetic Reconstructions in Solitary Bone Metastases of the Limbs According to Histotypes

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## Abstract

Patients with a solitary bone metastasis have a different prognosis according to primary tumor histotype. Surgeon has to consider this parameter when performing operations.

A good prognosis means a long survivorship, high functional demands, long lasting treatment and, overall, a quick rehabilitation program.

The study is on 36 patients with solitary bone metastasis from different Histotypes (Breast cancer, Kidney Cancer and Thyroid Cancer) which have been treated by resection and prostheses.

Clinical findings demonstrated that resections and prosthetic reconstructions are the gold standard to help surgeon to obtain the best results. Adjuvant systemic or local therapy may help when feasible.

**Keywords:** Metastasis; Bone resection; Prosthesis

## Introduction

Some tumors can have a long lasting prognosis, so metastatic patients survival is different according to Histotypes. By the time we tried to find an mutual agreement to classify and treat properly bone metastases [1,2].

Grimer et al. [3] in a work in 1992 said "The average survival rate after the endoprosthetic replacement was 14.7 months and this varies with the primary tumor."

Capanna et al. [4] demonstrated survival differences between Histotypes (Table 1).

This classification permits to divide tumors in 3 prognostic groups (less than 1-year survival, between 1 and 2 years and over 2 years) with a different value score. Also they divided metastatic patients in 4 classes (Table 2).

In a more recent study from Piccioli et al. [5] was developed a clinical decision support tool, capable of estimating the likelihood of survival at 3 and 12 months following surgery for patients with operable skeletal metastases.

A good prognosis is a central parameter in considering a radical surgery for solitary bone metastases treatment.

## Materials and Methods

In the current study only class 1 patients were considered. A series of 36 patients with solitary bone metastasis (28 proximal femurs and 8 proximal humerus), treated between 1998 and 2013, was considered according to primary tumor histotype: 25 adjuvant responder Breast cancer, 6 Kidney Cancer and 5 differentiated Thyroid Cancer. 30 female and 6 male. Mean age was 68 years (52-80). Mean follow-up was 18 months (6-72). Exclusion criteria were: multiple metastases, serious comorbidities and Class 2-3-4 patients.

All patients received a needle/open biopsy which confirmed

the primary tumor histotypes. Resections were performed about 2 weeks after biopsy. Kidney metastases were embolized 24-48 h before surgery. Modular tumoral prostheses were positioned. In 20 cases

survival	sources of metastasis
less than 1 year (1 point)	Unknown
	Melanoma
	Lung
	Pancreas
	Thyroid (undifferentiated)
	Stomach
One to two years (3 points)	Colon
	Breast (not responding to adjuvants)
	Liver
	Uterus (responding to adjuvants)
Over two years (6 points)	Thyroid (differentiated)
	Myeloma
	Lymphoma
	Breast (responding to adjuvants)
	Rectum
	Prostate
	Kidney

Table 1: Prognosis and histotype.

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Received August 28, 2015; Accepted March 03, 2016; Published March 08, 2016

Citation: Maccauro G, Piccioli A, Barreca S, Fenga D, Rosa MA (2016) Local Resections and Prosthetic Reconstructions in Solitary Bone Metastases of the Limbs According to Histotypes. J Integr Oncol 5: 161. doi:10.4172/2329-6771.1000161

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a polyethyleneterephthalate mesh (Trevira Tube<sup>®</sup>) [6] was used to help insert muscles on implant (Figures 1a and 1b).

Shoulders remained 20 days in a tutor, then started rehabilitation; Hip started walking in 2 postoperative days with 2 clutches and without bearing and 2 weeks after started walking with progressive bearing on the affected limb.

The Musculoskeletal Tumor Society Score (MTSS) [7] was performed in postoperative period to evaluate results.

About one month after surgery, patients with thyroid metastases got radioactive iodine therapy and patients with breast metastases received hormonal therapy, when feasible, or chemotherapy if they didn't get response. Kidney metastases didn't receive chemotherapy, because of the poor reaction to chemotherapy.

## Results

Mean MTSS was 72% (34%-90%). Complications were represented by delayed wound closure in 2 cases with superficial infection in 1 case. Wound surgical revision and targeted antibiotic therapy. There were no perioperative deaths. Best clinical results were obtained in patients with a high resection above gluteus maximus insertion in proximal femur (Figures 2a and 2b) and above deltoid insertion in proximal humerus (Figures 3a-3c).

Figure 2a shows MRI of a kidney metastasis in left proximal femur and Figure 2b shows the post-op X-Ray.

Figure 3a shows the pre-op X-Ray image of a thyroid metastasis in left humerus, Figure 3b shows the post-operative X-Ray and Figure 3c demonstrates good clinical results. Table 3 explain survival for each histotype.

class	
1	Solitary metastatic lesion Primary with good prognosis (well-differentiated thyroid, prostate, breast sensitive to adjuvants, rectum, clear-cell renal, lymphoma, myeloma) Interval over three years since detection of the primary
2	Pathological fracture at any site
3	Impending fracture in a major weight-bearing bone
4	Osteoblastic lesions at all sites Osteolytic or mixed lesions in non-structural bones (fibula, rib, sternum, clavicle) Osteolytic lesion with no impending fracture in major weight-bearing bone Lesions of the wing of the ilium, anterior pelvis or scapula excluding class-1 patients

Table 2: Classes of metastatic patients.

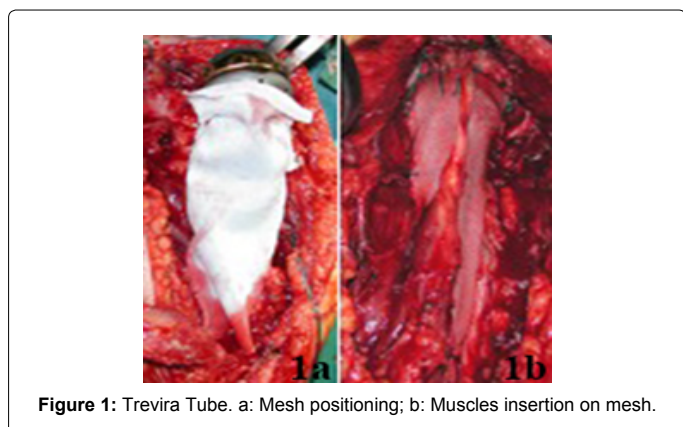


Figure 1: Trevira Tube. a: Mesh positioning; b: Muscles insertion on mesh.

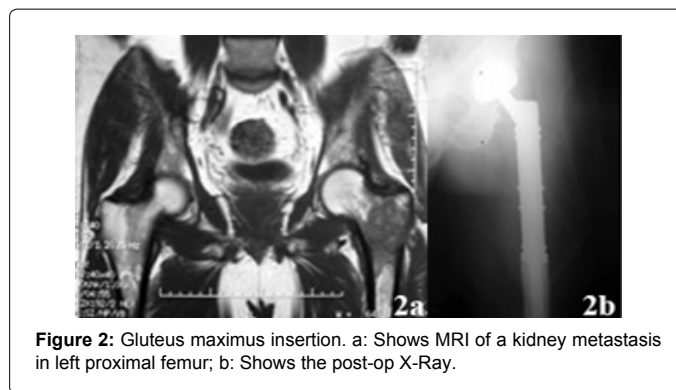


Figure 2: Gluteus maximus insertion. a: Shows MRI of a kidney metastasis in left proximal femur; b: Shows the post-op X-Ray.

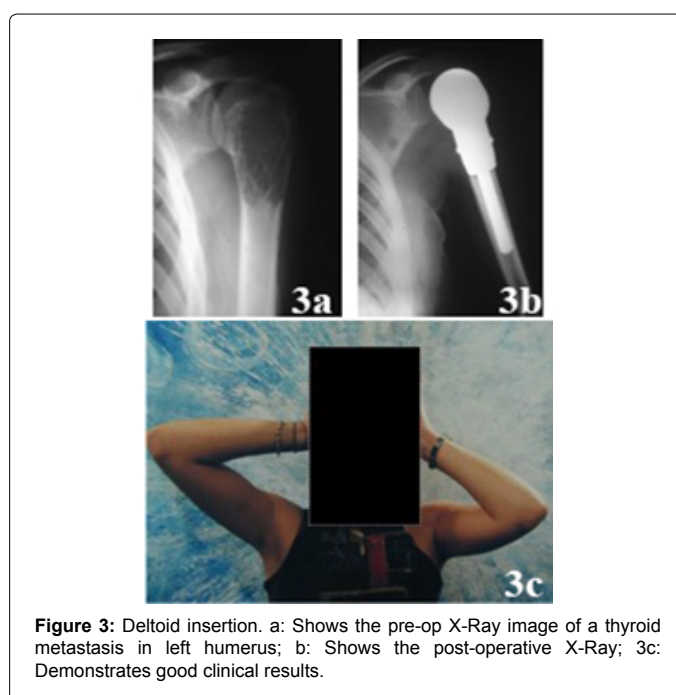


Figure 3: Deltoid insertion. a: Shows the pre-op X-Ray image of a thyroid metastasis in left humerus; b: Shows the post-operative X-Ray; 3c: Demonstrates good clinical results.

Survival	<12 months	24 months	36 months	48 months	>60 months
Thyroid		1	1	1	2
Kidney		1	1	2	2
Breast	6	4	2	8	5

Table 3: Survival for each histotype.

Resection and prosthetic replacement is the best option to get quick good functional and long lasting results in metastatic patients with good prognosis according to histology (class 1). Sørensen et al. [8] support there is no more incidence in death rate and surgical revision in prosthetic replacement compared with other technique.

Grimer et al. [9] concluded "that endoprosthetic replacement for bony metastases is an effective palliative procedure for a selected group of patients".

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