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Obesity and HIV Infection-is there a Role for Bariatric Surgery in Treatment?

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Abstract

Life expectancy of HIV-infected patients has improved in the recent decade with the use of antiretroviral therapy. Hence, more HIV-infected patients with chronic co-morbidities are being followed by different specialities. Diabetes and obesity are two of the co-morbidities. We looked at the outcome of bariatric surgery for 3 HIV-infected patients. We concluded that bariatric surgery is safe and can reduce pill burden. However, a multi-disciplinary team approach is needed to ensure that the right patients are selected and on-going support available to achieve the best outcome.

Keywords: Bariatric surgery; HIV patients; Diabetes; Weight loss

Introduction

Obesity is now a common problem in the UK and HIV-infected patients receiving Antiretroviral Therapy (ART) are not spared. Among patients receiving some antiretroviral medications, in particular, protease inhibitors there is increased risk of serious health problems associated with obesity, such as plasma high cholesterol level and diabetes mellitus. In contrast, some HIV infected patients may present with obesity and cardiovascular risk factors ab initio.

When changes in diet, exercise, and antiretroviral therapy fail to result in weight loss, bariatric surgery is a potential option to reduce obesity for some HIV positive individuals. The most common type of bariatric surgery is gastric bypass, in which stomach size is reduced by 95% and the upper intestine is bypassed. The cost effectiveness of bariatric surgery has been shown in several studies when compared to conventional treatment in large population cohort studies [1]. However, few data are available regarding safety, immunological and virological outcomes of such surgery in HIV-infected patients. We present here clinical outcomes of a series of 3 patients with HIV infection who underwent bariatric surgery for obesity following failure of conventional medical intervention.

Methods

3 patients (2 females, 1 male) aged 45 to 66 years, were recruited into the study. Detailed morphometric, immunological and virological data was obtained from the clinic database. All were obese at baseline, median body mass index (BMI) 44.8 and with at least 1 obesity-related comorbidity. Thus, 2 patients had diabetes mellitus and receiving oral hypoglycaemic agents, 2 were hypertensive on treatment and one was normotensive. 2 patients were virally suppressed on standard HAART comprising a combination of at least three drugs, i.e. either 2 Nucleoside Reverse Transcriptase Inhibitors (NRTIs) with 1 non-Nucleoside Reverse Transcriptase Inhibitor (NNRTI) or 2 NRTIs with 1 protease inhibitor (PI), (Table 1). One patient had undetectable viral load in absence of ART pre- and post-operatively. Such cases are sometimes referred to in literature as 'elite controllers'. All but one individual underwent bariatric surgery at one centre. Data were collected at each clinic visit up to 48 weeks follow-up. The primary outcome was body weight loss. Secondary end points included remission of type 2 diabetes mellitus, hypertension, metabolic syndrome and reduction in use of medications, adverse events and quality of life.

Results

2 of the three patients (cases 1, 2) experienced weight loss resulting in reduced BMI, which was sustained over 2 years of follow-up. The two diabetic patients became euglycaemic post-operatively (cases 1, 3) and both discontinued oral hypoglycaemic drug therapy including use of insulin in case 1. The latter remains off diabetic therapy after 3 years follow-up. In contrast, case 3 became diabetic again after 2 years of follow-up and was re-started on oral hypoglycaemic therapy. Both patients became normotensive whilst the third remained hypertensive post - surgery.

None of the patients experienced any adverse events post-operatively. All 3 patients have maintained viral suppression (undetectable viral load) with high $CD4^+$ T-lymphocyte cell counts. Plasma cholesterol and triglyceride levels remain unaltered in all patients after 2years of follow-up. Nutritional deficiency has not been detected in any of our patients (Table 1).

	Case 1	Case 2	Case 3
Age	66	39	45
Gender	Female	Female	Male
Ethnicity	Black African	Black African	Black Caribbean

Year of surgery	September 2011	September 2012	May 2010
Type of Surgery	Gastric Ileo-Bypass	Gastric banding	Gastric Bypass
Complications	None	None	None
Anti retroviral	None	Kivexa & Nevirapine	Truvada+Boosted Darunavir
CD4 & Viral load			
Pre surgery Post surgery	1158, VL UN 1270(47%), VL UN	590(39%), VL UN 630(42%), VL UN	507, VL UND 570(35%), VL UND
Medications Pre-Surgery	Metformin, Doxazocin Novarapid, Glargine, Lisinopril, Aspirin Indapamide, Ramipril Irbesartan Bisoprolol,	Amlodipine	Metformin, Gliclazide,Pravastatin, Olistat, Irbesartan, Aspirin, Pioglitazone and Escitalopram
Medications Post Surgery	AdCal D3, Aspirin	Only ARVs	Pteromax,,aspirin,selenium L-carnitine ,multivitamins, Pravastatin, vit D, lanzoprazole
Mean BP			
Pre Surgery Post Surgery	180/100 138/66	140/100 140/110	118/80 110/70
Diabetes	T2DM on insulin	No	T2DM
HbA1C			
Pre surgery Post Surgery	57 41	Not available	55 55
Weight			
Pre Surgery Post Surgery	121 87 Kg	140 Kg 135 Kg	105 Kg 107 Kg
BMI			
Pre Surgery Post Surgery	42.6 32.1	51.4 49.5	30.5 31.7
Social circumstances	Well supported	Social isolation, Marital Disharmony, Child with learning disability	Anxiety and Depression

Table 1: Cases description.

Discussion

The data from this case series lends support to previous reports showing bariatric surgery is beneficial and safe in obese HIV infected patients [2]. Weight loss is the main objective of the surgical intervention and was achieved in 2 of the three cases. However, in terms of overall outcomes, only 1 out of the 3 cases achieved maximum therapeutic benefit from bariatric surgery.

The discrepancy in the magnitude of weight loss among patients post- bariatric surgery is difficult to ascertain. The mechanism by which surgery effects weight loss is thought to involve a permanent loss of appetite brought about by a change in energy balance signals released from the gut. Whether differences exist in physiological compensatory mechanisms between non–responders and responders is unknown. Other plausible explanations for weight loss might include, insulin withdrawal, which in itself may have contributed to pre-operative weight gain as well as social factors. For example, a stable and supportive social background may have played a major role in the outcome post operatively in one of the patients (case 1). The latter observation underscores the need for careful patient selection for this procedure.

Concern has been expressed regarding the effect of rapid weight loss on immunologic function, i.e. decline in the $CD4^+$ T lymphocyte count following bariatric surgery, in particular among patients not receiving HAART. In a couple of reports, the fall in CD4 appeared to coincide with the onset of vitamin B12, folate and vitamin B1 deficiencies both of which are recognised complications of bariatric surgery [3,4]. Our data in the elite controller (Case 1) with the most profound weight loss does not support such observation. This patient maintained CD+ T cell counts in excess of 1,000 cells/cu.mm and undetectable plasma viral load despite 34 kg body weight loss.

The resolution of diabetes is almost certainly a consequence of weight loss. However, the exact mechanism by which bariatric surgery induces diabetes remission is still unclear. It is conceivable that gut hormones such as Glucagon-like peptide 1 (GLP-1) acting via the hypothalamus may, improve glycaemic control in part by reducing calorie intake and body weight [5]. In addition, an increase in the colonic Peptide YY (PYY) expression has been shown in mice following gastrointestinal bypass surgery [6]. This gut hormone which normally rises post-prandially in proportion to caloric intake, is also associated with decreased appetite and reduced food intake [7].

One notable feature from our cases is the dramatic reduction in pill burden shown in all 3 patients following bariatric surgery. Whether this outcome confers long term cost-benefit is difficult to predict. Retrospective studies show conflicting data with some showing reduced cost reduction in medications and others demonstrating no sustainability [8].

Conclusions

Bariatric surgery is safe in stable HIV-infected patients receiving multiple drug therapies. Our study also confirms reduction in pill burden as a direct consequence of such procedure. However, not all candidates are suitable to proceed to surgery, and a multi-disciplinary assessment involving psychological, surgical, dietetic and medical teams is needed to select the most appropriate candidates. Such selection should be carried out in an experienced bariatric centre. The choice of surgical procedure must also take into account the individual goals and existing patient co-morbidities. Long-term post bariatric follow-up of HIV positive patients is needed in order to determine why some patients regain weight and other perceived complications of this procedure.

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