Journal Homepage: - www.journalijar.com
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)
Article DOI: 10.21474/IJAR01/6347
DOI URL: http://dx.doi.org/10.21474/IJAR01/6347

RESEARCH ARTICLE

OUTCOME OF BARIATRIC SURGERY IN SAUDI ARABIA: A SYSTEMATIC REVIEW.

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Manuscript Info

Manuscript History

Received: 19 November 2017
Final Accepted: 21 December 2017
Published: January 2018

Key words:-
Bariatric Surgery, Saudi Arabia, Outcome, Systematic review

Abstract

Introduction: Obesity is a public health threat in Saudi Arabia and correlates directly to cardiovascular diseases, metabolic disorders and cancer. Step wise approach including life style interventions, diet and pharmacological therapies are effective means to control obesity. However, still there is a need for surgical intervention in specific cases that have been outlined recently in Saudi guidelines for preventions and management of Obesity.

Objective: The aim of this systematic review is to appraise results of different bariatric surgeries in terms of weight reduction and complication rates as reported in literatures.

Methodology: A systematic search of published literature that has addressed bariatric surgeries in Saudi Arabia was carried out via the internet, using the medical database MEDLINE/PubMed. Out of 80 articles retrieved and reviewed by authors, only 20 articles matched the filtering criteria excluding case reports studies or none original papers. Finally, at the end selection process, articles were examined in detail.

Results: For more than 25 years, bariatric surgeries have been practiced including both restrictive and malabsorption strategies. Significant reduction in body weight, BMI and Excess weight loss have been reported in different trials. The risks associated with such interventions include both metabolic, procedure-related complications, hormonal disturbances and malabsorption. However, the long-term experience derived extended follow up together with guidance of scientific bodies maximized benefits and reduced risks.

Conclusion: Extended experience in bariatric surgery with long term patient monitoring up to 5 years indicate that bariatric surgery is a very useful approach when practiced within the framework of international and local guidelines.

Introduction:-

Obesity is an emerging yet now considered a major health problem in Saudi Arabia that reaches the level of an epidemic. Its prevalence is rapidly increasing among children and adolescents. [1] Metabolic syndrome, some

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cancers and cardiovascular disorders are related pathologies to the gene-environment complex that underpin obesity development. Nevertheless, the quality of life is impaired among obese patients. Management of Obesity starts with Lifestyle modification, Exercise, diet adjustments and then pharmacological treatment as adjunct to previous approaches. [2]

The Ministry of Health in Saudi Arabia in collaboration with the McMaster University conducted an expert panel to develop evidence-based practice guideline in 2015 using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach. This describes the strength of recommendation and the quality of evidence. The strongest recommendations favoured lifestyle interventions, individualized counseling, physical activity in addition to diet, rather than diet alone. Pharmacological options included Metformin and Orlistat. Bariatric surgery was conditionally recommended for obesity management if BMI > 40 kg/m2 and > 35 kg/m2 with comorbidities. [2]

In addition to the Saudi MOH guidelines, the Saudi Arabian society of metabolic and bariatric surgery guidelines for prevention and management of obesity expanded bariatric surgery consideration to adults with BMI > 30 kg/m2 who have poorly controlled type 2 diabetes or with increased cardiovascular risk and post pubertal adolescents with very severe to extreme obesity and severe co-morbidities. [3] The metabolic response to surgical or non-surgical management of obesity, diet and lifestyle interventions, is highly dependent on microbial and metabolic phenotyping thus helps to understand the etiopathology of obesity. [4]

Surgical Options include Vertical Banded Gastroplasty (VBG) and Laparoscopic Adjustable Gastric Banding (LAGB). Other surgical options include laparoscopic Roux-en-Y gastric bypass (LRYGBP) and laparoscopic sleeve gastrectomy (LSG). The intra-gastric balloon (IGB) may also be used in mild to moderate obesity. [5,6]

The aim of this systematic review is to appraise results of different bariatric surgeries in terms of weight reduction and complication rates as reported in literatures.

Material and Method:-

A systematic search of published literature that has addressed bariatric surgeries in Saudi Arabia was carried out via the internet, using the medical database MEDLINE/PubMed, supported by the US National Library of Medicine. The review was conducted to the time of December 2017. The methodology followed by the researcher for the process of selection of articles is presented in. The researchers conducted a review process and the discordances were resolved by consensus. At a first stage, all published articles containing the words "Bariatric Surgery", "Obesity", in combination with "Saudi Arabia" as part of their title, as a keyword or as a reference in their abstract have been collected. The initial search retrieved 80 articles. A group of filtering conditions was adopted to confine the search results, excluding case reports studies or not original papers. Finally, at the end selection process, the remaining 20 articles were examined in detail.

Results:-

Pre-Operative assessment:-

Some authors suggested flexible esophagogastroduodenoscopy (EGD) prior to any weight-reduction surgery. The outcomes of such intervention might not change course of the surgery, yet it is of value in patients with anatomical variations like situs inversus. [7,8]

Intra-Operatively:-

Morbid obesity poses a big challenge to anesthesiologists to pass early and uneventful recovery. The use of BIS (bi-spectral index) in administering sevoflurane was studied by Ibraheim O at King Khaled University Hospital on 15 patients undergoing LAGB. Another 15 patients had sevoflurane administered according to the standard practice. The BIS group showed shorter time to awakening, extubation and also reduced sevoflurane consumption. [9]

Weight reduction:-

Intragastric Balloon:-

Between October 2002 till July 2004, Al-Momen A and El-Mogy I in Saad Specialist Hospital, Al-Khobar, placed intragastric balloons endoscopically, in forty-four subjects with a mean BMI of 45 kg/m2 and mean age of 31 years.

Patients were given a recommendation to remove them after 6 months of balloon insertion. The aim was to assess the tolerability and effectiveness of the BioEnterics Intragastric Balloon (BIB) retrospectively.

The results were that 2 patients had to undergo the BIB procedure twice. BIB placement was uneventful. All patients had their balloons removed under some sort of sedation either conscious sedation or general anesthesia.

The average EWL was 13 kg and reached 33 kg in the super-obese patients. The most prominent side effect was vomiting; mainly in the first week with occurrence rate of 77.2%; this regressed to be on occasional basis for >3 weeks (11.3%). Hypokalemia (6.8%) was also noted. Functional renal insufficiency was experienced in 4.5% of cases. Also reported abdominal pain by 15.9%, and GERD by 6.8%. There was a single case of gastric perforation which was managed laparoscopically following removal of the BIB, one case of gastric ulcer and four cases of intolerance (1 of these chose to revert to LAGB), and 1 mortality (not from the procedure but rather from other medical conditions. Six patients were lost to follow-up constituting 13.6%, 7 super-obese patients underwent LAGB at our hospital (one of these is mentioned above). [6]

Vertical Banded Gastroplasty:-
In a study by Mofti AB in King Khaled University Hospital, VBG was done on 39 morbidly obese patients (80% females). In a One year follow up of 38 patients the mean weight loss was 39% and 33% in Males and Females respectively. In Four years follow up though, 23 patients were followed up the mean weight loss was 42% and 41% in Males and Females respectively. Failure rate was 13% and mortality rate was 2.5%. [10]

Laparoscopic adjustable silicone gastric banding (LASGB):-
In a short prospective study by Ashy AA between October 26, 1995 and January 29, 1996, a single team in King Abdul Aziz University performed LASGB for Eighteen morbid and super-obese patients whose mean age 32 years (range 19-55 years), 11 were males and 7 were females. Their mean weight was 138 kg (98-191 kg) and the BMI ranged between range 36.3-65 kg/m2 with a mean of 49.8 kg/m2. This technique showed no major operative difficulties with good postoperative recovery despite the fact that the cases were super obese. [11]

Laparoscopic adjustable gastric banding (LAGB) vs. Vertical Banded Gastroplasty:-
The previous team conducted a comparative study prospectively on 60 patients, with the aim to compare weight reduction and LAGB and VBG. Upon Informed consent acquisition, thirty patients underwent VBG and the other thirty underwent LAGB; having the age, sex, preoperative weight and BMI matched. At 6 months postoperative follow up, the VBG group achieved excess weight loss of 87% while 50% was only noted in the LAGB group. [12]

Swedish adjustable gastric band (SAGB):-
Another 4-year study experience by Dhafar KO in Al-Noor Specialist Hospital in Makkah, aiming to give an account on weight reduction and postoperative sequalae after deploying the SAGB on 97 patients with Morbid obesity, had mean BMI 50.8 kg/m2 before SAGB. At 2 years follow up, 94 patients, 64 were females (68%) and 30 were males; benefited by losing weight with a mean Postoperative BMI of 35 kg/m2. One patient had a wound infection, considered as minor complication and 1 was lost to follow-up. Unfortunately, 2 mortalities were encountered early because of pulmonary embolism. [13]

In the same context, Al-Momen A, at Saad Specialist Hospital, Al-Khobar conducted SAGB on 140 consecutive patients between January 2001 and December 2004. 62% of them were females. The mean preoperative parameters were 124.5 kg (+23.9 SD), 45 kg/m2 (+6.3 SD), 37.9 years old (17-53) for weight, BMI and age respectively. The technique used for band placement was pars flaccida. No complications were seen, whether they were intra- or short postoperatively. No Mortality or conversion. The mean operating time was 122 minutes, with an average hospital stay of 5 days. The Mean weight loss was 52 kg and 75 kg at 12 and 30 months respectively leading to a 29 kg/m2 fall in BMI. [14]

LAGB in adolescents:-
Al-Qahtani AR in King Khalid University Hospital retrospectively studied the efficacy and safety of Laparoscopic Adjustable LAGB in adolescents between January 2003 and December 2005. A total of 51 subjects were analysed in this cohort study. Their mean age was 16.8 (9-19) years and had a mean BMI of 49.9 (38-63) kg/m2. This cohort study was not short of comorbidities; the most prevalent were limited physical activities, hypertension, obstructive sleep apnea, and diabetes mellitus. At 6 months 42% of their excess weight were lost and 60% at 1 year. No

mortalities or significant post-operative complications were reported in the 16-month mean follow up period (3-34 months). [15]

Laparoscopic sleeve gastrectomy (LSG):-
Long-term failure was also described with LAGB that required other bariatric procedure to correct. LSG has been another good alternative as a primary bariatric procedure and also as a revision to a failed LAGB. In a retrospective study conducted by Alqahtani AR at King Saud University between Sep-2007 and Apr-2012 on 184 subjects, 56 had conversion from LAGB to LSG and 128 had primary LSG. Absolute BMI reduction was assessed 24 months postoperative. It was found that Primary LSG group showed better reduction by 18.98 points, while the reduction was only 14.33 points in the LAGB revision. Percentage of excess weight loss (%EWL) was also assessed at the 24 months end point. %EWL was similar across both groups. It was however noted an increased complications rate on the primary LSG group by 7% (9 patients) while it was only 5.5% (2 patients) in the conversion group. [16]

A 5 years assessment of 1-stage gastric band extraction combined with LSG (Conversion-LSG) on 209 patients (group 1) compared to 3268 patients underwent primary LSG (Prim-LSG) (group 2) was conducted by the same investigators. There was no significant variation in the change of BMI among the both groups. It was noted that in group 1. A single patient developed a gastro-bronchial fistula 1 year after successfully stenting a leak. In group 2 though, endoscopic stenting resolved 3 cases of leakage, 3 experienced postoperative hemorrhage and a single case of venous thromboembolism which was cured by typical therapy. [17]

The same group also studied LSG in pediatric patients, where a major gap in the available evidence on bariatric surgeries in this age group. In a retrospective study conducted on 108 young patients aged less than 21 years old with a mean age of 13.9 years and a mean BMI 49.6 kg/m2. The %EWL of 32.4 at 3 months postoperative, 52.1 at 6 months postoperative, 65.8 at 12 months postoperative, and 64.9 % at 24 months postoperative was noted. The same study compared the results with the adult cohort of 114 patients whose mean age was 32.2 and the mean BMI was 48.3 kg/m2. There was %EWL of 30.9 at 3 months postoperative, 55.2 at 6 months postoperative, 65.8 at 12 months postoperative, and 69.7 % at 24 months postoperative. It concluded that LSG has similar efficacy and safety profiles in the pediatric and adult groups with a favorable safety profile in pediatrics having shown less complications. [18]

Complications:-
The complications of bariatric surgery include metabolic, procedure-related complications, hormonal disturbances and malabsorption. Some of the metabolic complications include hypoglycemia and osteoporosis. [19]

Neurological complications of bariatric surgeries were assessed in the period from January 2009 and December 2015 by Algahtani HA in King Saud Bin Abdul Aziz University. Only 3% of cases suffered neurological complications, nominally 15 cases out of 451. A single mortality was recorded yet 14 cases fully recovered representing 93.3%. The most common neurological complication was Axonal polyneuropathy. Other neurological complications included vitamin B12 deficiency, copper deficiency, Guillain-Barre syndrome and Wernicke syndrome. [20]

LAGB complications:-
Pulmonary complications appear to be the most encountered, yet late occurrence is far more pronounced. Alamoudi OS.at King Abdulaziz University Hospital reports 2 cases who presented 2-3 years after LAGB with Asthma like symptoms. Stomal obstruction and GERD (Gastro-esophageal reflux) lead to aspiration pneumonia of the first patient. The second patient however had left lobar pneumonia since the connecting catheter pierced the lung parenchyma through diaphragmatic migration. Radiologically the connecting catheter was apparent as a linear structure within the consolidated lung parenchyma. [21]

Cardiac index showed significant reduction during LAGB, where its mean values using the impedance cardiography (ICG) monitor in stages A (pre-insufflation), B (during pneumoperitoneum) and C (at gas deflation) were 2.4 (+0.6), 1.8 (+0.6) and 2.3 (+0.9) L/min/m2 respectively particularly in morbidly obese patients. [22]

LSG Complications:-
Despite the efficiency of LSG procedure as a standalone surgical modality or as corrective option for failed LABG, it does not come without complications. Micronutrients deficiencies were noted because of Malabsorption. Hakeam HA at King Faisal Specialist Hospital & Research Centre prospectively studied 61 patients who underwent LSG

between June 2007 to April 2008 with the aim of assessing iron indices; namely serum iron, transferrin saturation, ferritin and soluble transferrin receptor at 6 and 12 months post operatively as the study primary end point. The secondary endpoint though was to assess Vitamin B12 and RBC folate. At 1 year, there was a 4.9% occurrence of iron deficiency and anemia prevalence was also 4.9% of this cohort which was considered insignificant. Secondary endpoints were also decreased significantly. [23]

Considerations in bariatric surgery:-

Measuring the effectiveness or success of the surgery is crucial. The Bariatric Analysis and Reporting Outcome System (BAROS) is an effective method to quantify 3 outcomes, excess weight loss, cure or alleviating comorbidities, and enhancing quality of life. [24]

Removal of the IGB has been associated with high rate of weight regain. It has been hypothesized to concomitantly use GLP-1 (Glucagon-like peptide-1) agonists to sustain the weight reduction. Lariglutide was used by Mosli MM in King Abdul Aziz University Hospital on 44 patients out of 108 patients who had IGB. Lariglutide was not found efficient in reducing the weight regain at 6 months. [25]

Occasionally a 2-step surgery is recommended by band removal or repositioning in patients with high BMI. The absence of gastro-gastric suture (GGS) eases this reoperation. The impact of this reoperation and long-term complications were assessed at 17 bariatric centres on 706 patients. It was concluded at 3 years that GGS not only lowers reoperation rates but also prevents band slippage. Fixation in patients with high BMI needs separate assessment. [26]

After successful bariatric surgery 89.2% of cases developed sagging skin and thus were dissatisfied with their appearance. This was depicted in a study by Aldaqal SM in King Abdul Aziz University, in which 64 patients were studied. 51 of them were women. The most common dissatisfaction zones were upper arms (50%) and abdomen (45%). Thus, body contouring surgical procedure must be well-thought-out in managing morbid obesity. [27,28]

Conclusion:-

Obesity is a public health burden in Saudi Arabia impacting negatively not only the quality of life but also morbidity and even mortality outcomes. The Saudi Ministry of Health and Saudi Arabian Society of Metabolic Bariatric Surgery have already outlined their recommendations regarding both prevention and management of obesity. Over twenty-five years of experience in bariatric surgery with long term patient follow up till 5 years indicate that bariatric surgery is a very useful approach when practiced within the frame work of international and local guidelines.

Financial Disclosure:-

Self-funded

Authors Contribution:-

All authors contributed to this article including, searching, filtering, manuscript writing, reviewing and editing.

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