Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2015; 3(5B):1929-1935 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2015.v03i05.027

Review Article

Can We Consider Elbanna Bariatric by Pass in childhood obesity? Center Experience and Review of Literature

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Abstract: Childhood obesity has become one of the most important public health problems in many industrial countries. The awareness of childhood obesity as a modifiable health risk is high, but many societies do not establish the problem as high priority, as this health care problem may lead to comorbidities and even pre-mature death. In the current manuscript, our aim is to explore the available evidence and develop a consensus on the way forward, additionally to shed light the therapeutic relationships and enhance effectiveness in childhood obesity. We present here our experience to Clue out childhood morbid obesity presented with obesity related –complications. To our knowledge this is the first bariatric by-pass technique used both (banded gastric pouch), fundal resection and by-pass in pediatric obesity by Elbanna novel bariatric technique. Accordingly Bariatric surgery should be considered in complicated cases that failed all other options.
Keywords: bariatric, pediatric, childhood obesity, BMI, Elbanna.

INTRODUCTION

Childhood obesity became one of the most important public health problems in many countries with special concern to industrial countries. In the United States alone, reports dedicating co-morbidities and pre-mature death of children have severe obesity [1-3]. As the prevalence of obesity increases so does the prevalence of the comorbidities associated with obesity. Therefore, it is imperative that health care providers should identify overweight and obese children to start early counseling and therapy [4]. Unfortunately, until now there are no guidelines for bariatric surgery in childhood morbid obesity with complications. Considering such surgical intervention in childhood is a dilemma of substantial debate, however if diet, exercise and drugs fail to control comorbidities-related obesity in children, bariatric interventions should be suggested and the technique of choice should be optimized for each specific case .Until we can establish international guidelines. However discussion with the family (with written preoperative consent) and also with the child with approval ethical committee should be held on prior to the surgical therapy [5-8].

What we have to know about Childhood Obesity and related-medical/surgical management?

Children obesity has become one of the most important public health problems in the world, for example in The United States alone 5 % of children are obese, with the highest prevalence in Black and Mexican-American youth, accordingly , this group has significantly more cardiovascular risk factors and a greater risk for having obesity associated-comorbidities in adulthood [9-11]. For this reason it is imperative that health care providers identify overweight and obese children so that counseling and treatment can be provided.

The body mass index (BMI) is the accepted standard measure of overweight and obesity for children two years of age and older. Calculation of body mass index (BMI) is usually performed by two means;

A-English formula for BMI:

703 x Weight in pounds ÷ (Height in inches)[2]

B-Metric formula for BMI:

Weight in Kilograms ÷ (Height in meters)[2] .

However the metric formula is the famous one worldwide. A growing consensus supports the following definitions for children between 2 and 20 years of age.

- **Underweight** – BMI <5th percentile for age and sex
- **Normal weight** – BMI between the 5th and 85th percentile for age and sex
- **Overweight** – BMI between the 85th and 95th percentile for age and sex

●**Obese** – BMI ≥95th percentile for age and sex
●**Severe obesity** – BMI ≥120 percent of the 95th percentile values, **or** a BMI ≥35 kg/m^2 (whichever is lower). This corresponds to approximately the 99th percentile. Some authors distinguish an additional subgroup with more severe obesity with BMI ≥140 percent of the 95th percentile values **or** a BMI ≥40 kg/m^2, which corresponds to class III obesity in adults [12-19].

Comorbidities-associated Childhood Obesity

The comorbidities of obesity in childhood include abnormalities in the endocrine, cardiovascular, gastrointestinal, pulmonary, orthopedic, neurologic, dermatologic, and psychosocial systems. Certain comorbidities, such as type 2 diabetes mellitus and steatohepatitis that used to be considered "adult diseases" are now regularly seen in obese children. Moreover, obesity during adolescence increases the risk for disease and premature death during adulthood, independent of obesity during adulthood. As an example, in a longitudinal study, females who had been overweight during childhood had an increased risk of death from certain cancers, e.g.: breast cancer. Males who had been overweight or obese during childhood had an increased risk of death from vascular heart disease, arthrosclerosis and malignant hypertension, and then every effort should be consider treating overweight and obesity during childhood period [20-29]. Further we will present here for certain comorbidities – associated childhood obesity.

Psychological

In most modern cultures of the developed world there is some bias against individuals with obesity, which presumes that obesity is a character flaw. Old children with obesity have often absorbed the bias themselves, leading to self-criticism, low self-esteem, and hopelessness; these feelings are often barriers to behavior change especially in girls. Unfortunately many families with obesity are sensitive about discussing the issue. Fatness itself is representing a stigma in many societies. Additionally some skin change- related obesity may exacerbate the psychological behavior e.g: intertrigo, furunculosis, and hidradenitis suppurativa [30-37].

Neurological

The prevalence of idiopathic intracranial hypertension (pseudo tumor cerebri) is increased in children and adolescents with obesity [38, 39]. Neuralgia, neuro -muscular pain-related neuritis and idiopathic-nerve inflammation usually watched in obese or severely obese children.

Endocrine

The reported prevalence of impaired glucose tolerance among obese children and adolescents ranges from 7 to 25 percent, and the prevalence of type 2 diabetes ranges from 0.5 to 4 percent. Obese or morbid obese girls are at increased risk delayed puberty and hyperandrogenism at the time of puberty, additionally early onset polycystic ovary syndrome (PCOS) is common among them. PCOS can include a variety of clinical abnormalities, including hirsutism, menstrual irregularities, acanthosis nigricans, acne, and seborrhea.

More than 50 percent of obese children have lipid abnormalities as measured by a fasting lipid profile. Additionally children obesity predisposes to a number of other risk factors for atherosclerosis classified to have elevated concentration of serum low-density lipoprotein (LDL)-cholesterol and triglycerides and decreased concentration of high-density-lipoprotein (HDL)-cholesterol, accordingly children with obesity are three times more likely to have hypertension than nonobese children during adulthood [40, 47].

GIT and Liver

More than 50 percent of obese, morbid obese or severely obese children have NASH; it is well known that elevated serum aminotransferase concentrations are proportionally correlated with progressive increasing of BMI in many medical situations. We have not sufficient data if such NASH may develop to liver cirrhosis, however long standing NASH with elevated liver enzymes is very suggestive occasion for development of liver fibrosis and cirrhosis [48, 49].

According to our experience we reported few cases presenting with cholilithiasis during childhood period at 16 years old. However incidence of adult cholilithiasis will increase in those with a history of childhood obesity.

Pulmonary

Many children with obesity suffering sleep apnea and obesity hypoventilation syndrome and the risk is higher among those with severe obesity. However those with family history of obesity have clinically significant pulmonary diseases [50].

Orthopedic and Rheumatological

Obese children have an increased prevalence of fractures, genu valgum, and musculoskeletal pain. Common orthopedic and rheumatological comorbidities of childhood obesity include slipped capital femoral epiphysis (SCFE), Perth's diseases and tibia vara (Blount disease). In addition impaired mobility, and lower extremity malalignment than no obese children [51, 52]. Autoimmune diseases and pre-mature rheumatoid arthritis and arthralgia are not uncommon presentation in early adulthood patients with long standing childhood obesity.

Management

The American Academy of Pediatrics (AAP) suggests a staged approach to children obesity

management. Initially BMI, body weight percentile and comorbidities associated, should be considered and determined by primary care professionals. Additional intervention to address overweight or obesity is divided into stages representing escalating degrees of supervision, education, family counseling, medications and even intervention. These stages are:

- Stage 1: Prevention plus
- Stage 2: Structured weight management
- Stage 3: Comprehensive multidisciplinary evaluation
- Stage 4: Tertiary care intervention.

In stage 4 a multidisciplinary team will determine the success goal with a scientific plan-approach, as guided by established protocols. However the clinician's experience and each-child clinical presentation may determine various modalities are available including: highly structured diets, medications, or even bariatric surgery. However no guide lines are established for those should go through bariatric interventions, additionally which type procedure is preferred than other surgical options, hence the matter is a case by case center by center, with a matter of debate for each cultural education [53-57].

Our Center Experience

To establish a therapeutic relationship and enhance effectiveness, the communication and interventions should be supported by the entire family, society, school, public media and primary health care. Accordingly, we proposed a new procedure of Bariatric intervention (Novel Elbanna operation) in such complicated case that failed all other options, with surgical modification that would help the overall success.

On June 2014, the female child patient experienced the operation, (Modified Elbanna operation), time of operation was 110 minutes, Gastrographin test was done succesfully, and the child did not need any blood administration post-operative. She was discharged on the fourth post-operative day in an average general condition, follow up revealed progressive weight loss without any vitamins, minerals or iron supplementation, she experienced gradual psychological improvement with average biochemical investigations, seven months post-operative the child experienced regular menstruation, On April 2015; 13 months post-operative, her BMI become 29 with accepted psychological condition and nice body contour, she added the following statement; (Now I can play and run like any child, my friends call me every time sharing them the football team).

To our knowledge this is the first reported childhood bariatric operation, using Novel El Banna technique.

DISCUSSION

Obesity is a chronic disease that impairs health-related quality of life in adolescents and children. In 2010, overweight and obesity were estimated to cause 3.4 million deaths, 3.9% of years of life loss, and 3.8% of disability adjusted life-years worldwide. The rising prevalence of childhood obesity in several countries has been described as a global pandemic with special concern to industrial countries, e.g.; USA (Fig-; 1, 2, 3, 4).

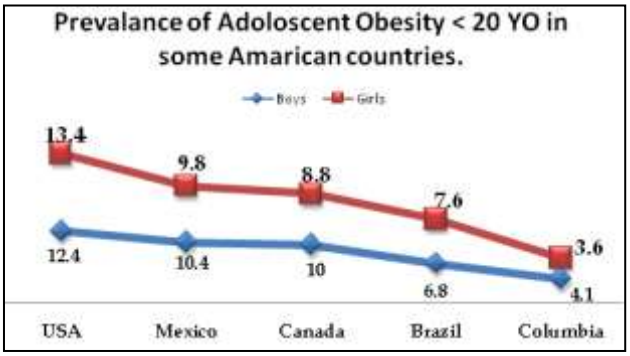

Fig 1: Prevalence of adoloscent obesity <20 YO in some American countries

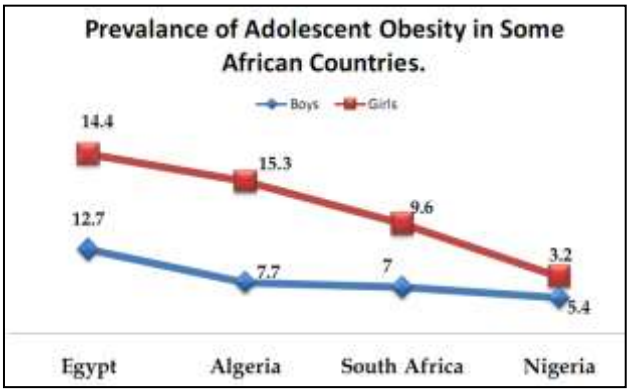

Fig 2: Prevalence of adolescent obesity in some African countries

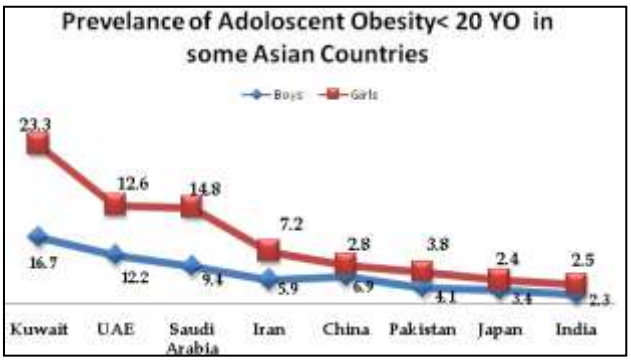

Fig 3: prevalence of adolescent obesity, 20 YO in some African countries

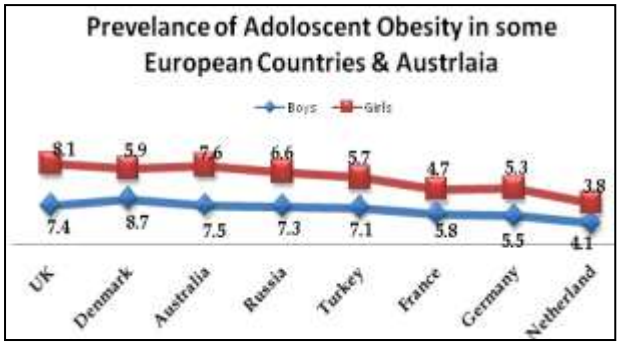

Fig 4: Prevalence of adolescent obesity in some European countries & Australia

Obesity can be considered like the driving force towards pre-mature deaths. It increases the like hood for the development of diabetes, NASH, depression and heart diseases [58-61]. The comorbidities of obesity in childhood include abnormalities in the endocrine, genital, cardiovascular, pulmonary, gastrointestinal, hepatic, orthopedic, neurologic, dermatologic, and psychosocial systems that significantly affect both quality of life and survival. Hence treating childhood obesity means overcoming illness at the present, complications in adulthood future and alleviating the economic burden in the present and future; childhood and adulthood periods.

Due to a lack of nonsurgical options for severely obese adolescents and a demonstrated safety and efficacy record in adults, there has been increasing interest in surgical procedures for weight loss for selected obese adolescents with severe obesity or complicated morbid obesity, hence bariatric surgery remains the only effective sustained weight loss option for morbidly obese patients in many situations, however the procedure is not recommended widely in children with severe obesity, bariatric surgery is the only option-solution for children with complications which affect quality of life or survival in many situations [62-66] .

All bariatric operations concerned with restrictive and / or mal absorption maneuvers; less food intake and mal absorption concept. The most common operations performed worldwide are Roux-en-Y gastric bypass (RYGB), the laparoscopic adjustable gastric band (GB), and the sleeve gastrectomy (SG) [67-68] .However, there are no available reports describing the overall success or complications following bariatric surgeries in childhood obesity due to the lack of information or unaccepted idea itself in pediatric field. A new trend of bariatric operation; Modified Intestinal Bypass (MIBP) with or without fundal resection; (Elbanna Technique), Figure (3), recently has been presented as a new promising bariatric surgical technique in adulthood bariatric interventions, by which we can avoid vitamins and trace elements deficiency that usually follows the other surgical bariatric diversion techniques, e.g.; BPD, BPD/DS (biliopancreatic diversion with or without duodenal switch), Roux en Y-GBP, MGB (Mini Gastric Bypass), and sleeve bypass, additionally the novel technique can preserve biliopancreatic secretions, also it preserve anatomical external biliary pathway, by which ERCP can be performed if surgical obstructive jaundice develops early or late after the bariatric procedure [69-71] .

Anatomical, surgical and physiological idea behind the novel Elbanna procedure is to preserve the gastrointestinal anatomy as far as we can, where most of the digestive enzymes, HCl, hormones and intrinsic factors are secreted. Absorption of digested amino acids & biliopancreatic enzymes essential for digestion of protein and fats to extract vitamins, vitamins and minerals occur in the preserved segments, at 50 cm from the dudenojejunal flexure we transect the jejunum. Re-anastomosis is performed between the proximal jejunum and the terminal ileum 100 cm from the iliocecal valve. Duodenum, Proximal 50 cm of jejunum and 100 cm of terminal help the physiological absorption. Preservation of the anatomical biliary drainage and enterohepatic circulation are the most procedural advantage. Fundal resection performed to get maximum effect on appetite and satiety.

In this case report of female child 12 years old presented with complicated sever obesity; BMI (44.8), in the form of Perth's disease accompanied with depression and amenorrhea, modified Elbanna bypass operation performed after ethical consideration and family agreement, the child discharged in the day 4 after operation in accepted general condition, she recovered from depression 2 months after operation, menstruation occurred 4 months post operatively. 10 months after then her BMI became (29) with accepted clinical, lab and sonographic criteria.

CONCLUSION

In conclusion, we strongly believe that Bariatric By-pass surgery could be considered in complicated childhood patients who failed all other medical therapies, additionally depression, and psycho-social disorders should be considered in obese children in many circumstances not to affect their coming future. However, we are in need for international guidelines for such issue with many medical, social and ethical debates.

REFERENCES

1. Ng M, Fleming T, Robinson M, Thomson B, Graetz N, Margono C *et al.;* Prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet 2014; 384: 766-781
2. Jolliffe D; Extent of overweight among US children and adolescents from 1971 to 2000. Int J Obes Relat Metab Disord 2004; 28: 4

3. Hogan MC, Foreman KJ, Naghavi M, Ahn SY, Wang M, Makela M *et al.;* Maternal mortality for 181 countries, 1980-2008: a systematic analysis of progress towards Millennium Development Goal 5. Lancet 2010; 375: 1609-1623.
4. Rajaratnam JK, Marcus JR, Flaxman AD, Wang H, Levin-Rector A, Dwyer L *et al.;* Neonatal, postneonatal, childhood, and under-5 mortality for 187 countries, 1970-2010: a systematic analysis of progress towards Millennium Development Goal 4. *Lancet* 2010; 375: 1988-2008
5. Mechanick JI, Youdim A, Jones DB, Garvey WT, Hurley DL, McMahon MM *et al.;* Clinical practice guidelines for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient--2013 update: cosponsored by American Association of Clinical Endocrinologists, The Obesity Society, and American Society for Metabolic & amp; Bariatric Surgery. *Obesity* (Silver Spring) 2013; 21 Suppl 1: S1-27
6. Bleich S, Cutler D, Murray C, Adams A; Why is the developed world obese? Annu Rev Public Health 2008; 29:273-295.
7. Food and Agriculture Organization Corporate Statistical Database. Food balance sheets. Available from: URL: http://faostat3.fao.org/faostat-gateway/go/to/home/E
8. UN Department of Economic and Social Affairs, Population Division. World population prospects: the 2010 revision. Volume 1: Comprehensive tables. New York: United Nations, 2011.
9. Ogden CL, Carroll MD, Kit BK, Flegal KM; Prevalence of childhood and adult obesity in the United States, 2011-2012. JAMA 2014; 311: 806.
10. Dietz WH, Robinson TN; Clinical practice. Overweight children and adolescents. N Engl J Med 2005; 352: 2100.
11. Flodmark CE, Lissau I, Moreno LA; New insights into the field of children and adolescents' obesity: the European perspective. Int J Obes Relat Metab Disord 2004; 28: 1189.
12. Deurenberg P, Weststrate JA, Seidell JC; Body mass index as a measure of body fatness: age- and sex-specific prediction formulas. Br J Nutr 1991; 65: 105.
13. Baker S, Barlow S, Cochran W; Overweight children and adolescents: a clinical report of the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition. J Pediatr Gastroenterology Nutr 2005; 40: 533.
14. Kelly AS, Barlow SE, Rao G; Severe obesity in children and adolescents: identification, associated health risks, and treatment approaches: a scientific statement from the American Heart Association. Circulation 2013; 128: 1689.
15. Skinner AC, Skelton JA.; Prevalence and trends in obesity and severe obesity among children in the United States, 1999-2012. JAMA Pediatr 2014; 168: 561.
16. Flegal KM, Wei R, Ogden CL, et al. Characterizing extreme values of body mass index-for-age by using the 2000 Centers for Disease Control and Prevention growth charts. Am J Clin Nutr 2009; 90: 1314.
17. Gulati AK, Kaplan DW, Daniels SR; Clinical tracking of severely obese children: a new growth chart. Pediatrics 2012; 130: 1136.
18. Freedman DS, Mei Z, Srinivasan SR; Cardiovascular risk factors and excess adiposity among overweight children and adolescents: the Bogalusa Heart Study. J Pediatr 2007; 150:12.
19. Skelton JA, Cook SR, Auinger P; Prevalence and trends of severe obesity among US children and adolescents. Acad Pediatr 2009; 9: 322.
20. van Dam RM, Willett WC, Manson JE, Hu FB; The relationship between overweight in adolescence and premature death in women. Ann Intern Med 2006; 145:91.
21. Must A, Jacques PF, Dallal GE, et al. Long-term morbidity and mortality of overweight adolescents. A follow-up of the Harvard Growth Study of 1922 to 1935. N Engl J Med 1992; 327: 1350.
22. Must A, Phillips SM, Naumova EN; Occurrence and timing of childhood overweight and mortality: findings from the Third Harvard Growth Study. J Pediatr 2012; 160: 743.
23. Bjørge T, Engeland A, Tverdal A, Smith GD; Body mass index in adolescence in relation to cause-specific mortality: a follow-up of 230,000 Norwegian adolescents. Am J Epidemiol 2008; 168: 30.
24. Inge TH, King WC, Jenkins TM; The effect of obesity in adolescence on adult health status. Pediatrics 2013; 132: 1098.
25. Sabin MA, Ford AL, Holly JM; Characterisation of morbidity in a UK, hospital based, obesity clinic. Arch Dis Child 2006; 91: 126.
26. Healthy study Group, Kaufman FR, Hirst K; Risk factors for type 2 diabetes in a sixth- grade multiracial cohort: the Healthy study. Diabetes Care 2009; 32: 953.
27. Marcus MD, Baranowski T, DeBar LL; Severe obesity and selected risk factors in a sixth grade multiracial cohort: the Healthy study. J Adolesc Health 2010; 47: 604.
28. Strauss RS; Childhood obesity and self-esteem. Pediatrics 2000; 105: e15.
29. Wyatt SB, Winters KP, Dubbert PM; Overweight and obesity: prevalence, consequences, and causes of a growing public health problem. Am J Med Sci 2006; 331: 166-174
30. Lamers F, van Oppen P, Comijs HC, Smit JH, Spinhoven P, van Balkom AJ et al., Comorbidity patterns of anxiety and depressive disorders in a large cohort study: the Netherlands Study of Depression and Anxiety (NESDA). J Clin Psychiatry 2011; 72: 341-348

31. Strauss RS, Pollack HA; Social marginalization of overweight children. Arch Pediatr Adolesc Med 2003; 157: 746.
32. Eisenberg ME, Neumark-Sztainer D, Story M; Associations of weight-based teasing and emotional well-being among adolescents. Arch Pediatr Adolescent Med 2003; 157: 733.
33. Pine DS, Goldstein RB, Wolk S, Weissman MM; The association between childhood depression and adulthood body mass index. Pediatrics 2001; 107: 1049.
34. French SA, Story M, Perry CL; Self-esteem and obesity in children and adolescents: a literature review. Obes Res 1995; 3: 479.
35. Stunkard A, Burt V; Obesity and the body image. II. Age at onset of disturbances in the body image. Am J Psychiatry 1967; 123: 1443?
36. Becker ES, Margraf J, Türke V; Obesity and mental illness in a representative sample of young women. Int J Obes Relat Metab Disord 2001; 25 Suppl 1: S5.
37. Goodman E, Whitaker RC; A prospective study of the role of depression in the development and persistence of adolescent obesity. Pediatrics 2002; 110:497.
38. Scott IU, Siatkowski RM, Eneyni M; Idiopathic intracranial hypertension in children and adolescents. Am J Ophthalmol 1997; 124: 253.?
39. Brara SM, Koebnick C, Porter AH, Langer-Gould A; Pediatric idiopathic intracranial hypertension and extreme childhood obesity. J Pediatr 2012; 161:602. Weisberg LA, Chutorian AM. Pseudo tumor cerebri of childhood. Am J Dis Child 1977; 131:1243.
40. Williams DE, Cadwell BL, Cheng YJ; Prevalence of impaired fasting glucose and its relationship with cardiovascular disease risk factors in US adolescents, 1999-2000. Pediatrics 2005; 116:1122.
41. Shah S, Kublaoui BM, Oden JD, White PC; Screening for type 2 diabetes in obese youth. Pediatrics 2009; 124:573.
42. Sinha R, Fisch G, Teague B; Prevalence of impaired glucose tolerance among children and adolescents with marked obesity. N Engl J Med 2002; 346: 802.
43. Tirosh A, Shai I, Afek A; Adolescent BMI trajectory and risk of diabetes versus coronary disease. N Engl J Med 2011; 364: 1315.
44. Juonala M, Magnussen CG, Berenson GS; Childhood adiposity, adult adiposity, and cardiovascular risk factors. N Engl J Med 2011; 365: 1876.
45. Steinberger J, Daniels SR, Eckel RH; Progress and challenges in metabolic syndrome in children and adolescents: a scientific statement from the American Heart Association Atherosclerosis, Hypertension, and Obesity in the Young Committee of the Council on Cardiovascular Disease in the Young; Council on Cardiovascular Nursing; and Council on Nutrition, Physical Activity, and Metabolism. Circulation 2009; 119: 628.
46. Weiss R, Dziura J, Burgert TS; Obesity and the metabolic syndrome in children and adolescents. N Engl J Med 2004; 350: 2362.
47. Shalitin S, Abrahami M, Lilos P, Phillip M; Insulin resistance and impaired glucose tolerance in obese children and adolescents referred to a tertiary-care center in Israel. Int J Obes (Lond) 2005; 29:571.
48. Lavine JE, Schwimmer JB; Nonalcoholic fatty liver disease in the pediatric population. Clin Liver Dis 2004; 8:549.
49. Huang JS, Barlow SE, Quiros-Tejeira RE; Childhood obesity for pediatric gastroenterologists. J Pediatr Gastroenterol Nutr 2013; 56:99.
50. Speiser PW, Rudolf MC, Anhalt H; Childhood obesity. J Clin Endocrinol Metab 2005; 90:1871
51. Goulding A, Jones IE, Taylor RW; Bone mineral density and body composition in boys with distal forearm fractures: a dual-energy x-ray absorptiometry study. J Pediatr 2001; 139:509.
52. Dimitri P, Wales JK; Bishop N. Fat and bone in children: differential effects of obesity on bone size and mass according to fracture history. J Bone Miner Res 2010; 25: 527.
53. Oude Luttikhuis H, Baur L, Jansen H; Interventions for treating obesity in children. Cochrane Database Syst Rev 2009; CD001872.
54. Spear BA, Barlow SE, Ervin C; Recommendations for treatment of child and adolescent overweight and obesity. Pediatrics 2007; 120 Suppl 4: S254.
55. Whitlock EP, O'Connor EA, Williams SB; Effectiveness of weight management interventions in children: a targeted systematic review for the USPSTF. Pediatrics 2010; 125: e396.
56. Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents, National Heart, Lung, and Blood Institute. Expert panel on integrated guidelines for cardiovascular health and risk reduction in children and adolescents: summary report. Pediatrics 2011; 128 Suppl 5:S213.
57. Majdan JF; Memoirs of an obese physician. Ann Intern Med 2010; 153:686.
58. Knowlden AP, Sharma M; Social cognitive maternal-mediated nutritional correlates of childhood obesity. Int Q Community Health Educ. 2015; 35(2): 177-91.
59. Onge ES, Miller SA, Motycka C, DeBerry AA; review of the treatment of type 2 diabetes in children. J Pediatr Pharmacol Ther. 2015; 20(1): 4-16.
60. Sylvetsky-Meni AC, Gillepsie SE, Hardy T, Welsh JA; The Impact of Parents' Categorization of Their Own Weight and Their Child's Weight on Healthy Lifestyle Promoting Beliefs and Practices. J Obes. 2015; 2015: 307381.
61. Schauer PR, Kashyap SR, Wolski K, Brethauer SA, Kirwan JP, Pothier CE *et al.;* Bhatt DLBariatric surgery versus intensive medical therapy in obese

patients with diabetes. N Engl J Med 2012; 366: 1567-157.
62. American Gastroenterological Association. American Gastroenterological Association medical position statement on Obesity. Gastroenterology, 2002; 123: 879.2.
63. Klein S, Wadden T, Sugerman HJ; AGA technical review on obesity. Gastroenterology 2002; 123: 882.3.
64. Snow V, Barry P, Fitterman N; Pharmacologic and surgical management of obesity in primary care: a clinical practice guideline from the American College of Physicians. Ann Intern Med 2005; 142: 525.4.
65. Tucker ON, Szomstein S, Rosenthal RJ; Nutritional consequences of weight-loss surgery. Med Clin North Am 2007; 91:499.
66. Younossi ZM, Stepanova M, Negro F, Hallaji S, Younossi Y, Lam B *et al*.; Nonalcoholic fatty liver disease in lean individuals in the United States. Medicine (Baltimore) 2012; 91: 319-327.
67. American Society for Metabolic and Bariatric Surgery (2009) Fact Sheet: Metabolic & Bariatric Surgery. Available online at: www.asbs.org/Newsite07/media/asbs_presskit.htm (Accessed on January 28, 2009).15.
68. Nguyen NT, Masoomi H, Magno CP; Trends in use of bariatric surgery, 2003-2008. J Am Coll Surg 2011; 213:261.
69. Elrazek AE, Elbanna AE, Bilasy SE; Medical management of patients after bariatric surgery: Principles and guidelines.World J Gastrointest Surg. 2014 Nov 27; 6(11):220-8.
70. Elbanna A, Tawella N, Neff K, Abd Elfattah A, Bakr I. Abstracts from the 18th World Congress of the International Federation for the Surgery of Obesity & Metabolic Disorders (IFSO), Istanbul, Turkey 28-31 August 2013. Obes Surg 2013; 23: 1017-1243.
71. Elbanna A, Taweela NH, Gaber MB, Tag El-Din MM, Labib MF, Emam MA *et al.*; Medical Management of Patients with Modified Intestinal Bypass: A New Promising Procedure for Morbid Obesity. GJMR 2014; 14: 8-19.

Appendix

Novel Elbanna Operation.
We preserve Duodenum, 50 Cm of Proximal Jejunum and 100 Cm of the ileum to maintain physiological digestion and absorption, additionally preserve the enterohepatic circulation.