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Mexican Journal of Medical Research ICSa

Biannual Publication, Vol. 13, No. 25 (2025) 41-47

ISSN: 2007-5235

Ethical aspects of Bariatric Surgery in adolescents

Aspectos éticos de la Cirugía Bariátrica en adolescentes

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Abstract:

Obesity in adolescents is a global health challenge. Its prevalence is increasing worldwide. Importantly, being overweight and obese are linked to a higher risk of death compared to being underweight. The objective of the present narrative review was to discuss the main ethical challenges (autonomy, beneficence, non-maleficence, justice) and implications of bariatric surgery in adolescence. The surgical treatment of morbid obesity in adolescents is a therapeutic modality considered in a selected group of adolescents with severe obesity who meet the requirements and recommendations to improve their quality of life, reducing metabolic risks, associated diseases, and early mortality. Bariatric surgery should not be an isolated procedure but should be associated with a set of interventions to strengthen permanent lifestyle changes.

Keywords:

Obesity, adolescents, bariatric surgery, ethics.

Resumen:

La obesidad en adolescentes es un desafío global para la salud, su prevalencia está en aumento a nivel mundial. Es importante destacar que el sobrepeso y la obesidad están relacionados con un mayor riesgo de muerte en comparación con el bajo peso. El objetivo de la presente revisión narrativa fue discutir los principales desafíos éticos (autonomía, beneficencia, no maleficencia, justicia) y las implicaciones de la cirugía bariátrica en la adolescencia. El tratamiento quirúrgico de la obesidad mórbida en el adolescente, es una modalidad terapéutica que puede ser considerada en un grupo seleccionado de adolescentes con obesidad severa, que cumplan con los requisitos y recomendaciones, con el objetivo de mejorar su calidad de vida, reducir riesgos metabólicos, enfermedades asociadas y mortalidad temprana. La cirugía bariátrica no debe indicarse como un procedimiento aislado, sino debe estar asociada a un conjunto de intervenciones orientadas a fortalecer cambios permanentes en el estilo de vida.

Palabras Clave:

Obesidad, adolescentes, cirugía bariátrica, ética.

INTRODUCTION

Obesity in adolescents is a global health challenge; the prevalence is increasing worldwide[1]; there is a high probability that obesity during adolescence persists into adulthood[2], which is related to the presence of cardiovascular, metabolic, and psychosocial diseases. It also increases the risk of premature mortality.[3] In turn, overweight and obesity are linked to a higher risk of death compared to underweight.[4] Data from the World Health Organization (WHO) estimated in 2016, more than 340 million children and adolescents between 5 and 19 years old were overweight or obese[1]; this increase has occurred similarly in both boys and girls, with 18% of girls and 19% of boys being overweight.[4] The primary approach to obesity and metabolic syndrome treatment in adolescents focuses on diet, exercise, and behavioral changes.[5-6] However, these approaches have moderate to low effects in patients with the highest degrees of obesity.[7] Furthermore, approved pharmacological treatments for obesity in adolescents are limited.[8] Currently, only two drugs are approved by the Food and Drug Administration (FDA) for use in youth patients: sibutramine and orlistat.[9] The most frequently observed adverse effects are vasoconstriction, increase in blood pressure, tachycardia, insomnia, dizziness, anxiety, depression,

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Received: 04/03/2024, Accepted: 13/05/2024, Postprint: 13/08/2024, Published: 05/01/2025

DOI: https://doi.org/10.29057/mjmr.v13i25.12415

constipation and headache.[9] In the field of adolescent obesity treatment, Bariatric Surgery (BS) has gained increasing attention as a viable option, especially considered for adolescents with severe obesity who have not responded to conservative treatments (single component treatment).[10] The possibility of performing BS in this age group appears from the good results in adults; however, surgical intervention in adolescents raises peculiar aspects (reduction in BMI and improvement or resolution of associated comorbid conditions, especially type II diabetes mellitus).[11] The question arises as to whether BS should be a treatment for severe obesity in this population. BS aims to minimize health problems, yet it is necessary to acknowledge we count on insufficient data on the safety, evolution and cost-benefit relationship of the procedure in adolescents.[12] Additionally, a lack of physical and emotional maturity at this stage of life can create challenges related to autonomy and decision-making.

MAIN SURGICAL PROCEDURES OF BARIATRIC SURGERY

Gastric Bypass (gastroplasty with Roux-en-Y intestinal bypass)

It is the most used technique due to its safety and effectiveness. The patient can lose 40% or more of excess weight. This technique reduces the deviation of the stomach and intestine to promote the increase of hormones that give the feeling of satiety and reduce hunger. In consequence, lower intake and increased satiety cause the patient to lose weight and control diabetes and other diseases associated with obesity.[13]

Adjustable gastric band

It promotes hormonal changes but is safe and effective in reducing weight (20% to 30% overweight) and can help in the treatment of type II diabetes. It is the installation of an adjustable silicone band around the stomach that, by squeezing the organ, makes it possible to control gastric emptying.[13,14]

Gastric sleeve

The gastric sleeve reduces the stomach, leaving it with an approximate capacity of 80 ml to 100 ml. Weight loss is similar to that obtained with the gastric bypass and higher than with the adjustable elastic band. The procedure is relatively new and offers good results in controlling blood pressure, cholesterol, triglycerides, and obesity-associated diseases.[13]

Duodenal junction

The duodenal junction removes 85% of the stomach, but the basic physiology of the stomach and its emptying are maintained; weight loss is much higher, and one of the reasons is reduced nutrient absorption; weight loss is approximately 40% to 50%.[13]

The WHO concluded that the gastric band is the most common procedure to address adolescent obesity because it is less invasive.[15] However, with the review of these studies[13], the evidence for BS in these age groups is still insufficient, especially concerning long-term results (>10 years).[13] The gastric bypass (gastroplasty with Roux-en-Y intestinal bypass) is considered effective in treating obesity-related health problems in adolescents.[16] To obtain the best results, a multidisciplinary team of pediatric specialists is necessary for preoperative and postoperative decision-making[17], according to the guidelines of the pediatric committee of the American Society for Metabolic and Bariatric Surgery (ASMBS)[18], which suggests a multidisciplinary team consisting of a BS with experience in adolescents, a nutrition specialized pediatrician, an experienced nutritionist in pediatric obesity and working with families, a psychologist and, or psychiatrist with training in pediatrics/adolescence and experience in the treatment of obesity and eating disorders and a kinesiologist or exercise physiologist.[19] BS is associated with effective and sustained weight loss, resolution of comorbidities and improved quality of life.[20] However, its use in adolescent patients is still limited, in part due to ethical concerns related to performing an irreversible and invasive procedure in adolescence, with possible lifelong implications.[13] It is important to remember that adolescents are a vulnerable population for decision-making[21], where their freedom and autonomy must be considered. Additionally, many of them suffer from body dissatisfaction, low self-esteem, and mood disorders, which adds to a possible history of eating disorder symptoms[22], these factors can have a significant impact on the decision to undergo BS and in the results obtained. It is relevant to mention that the results of the long-term psychosocial consequences of BS in adolescents are limited and require specific attention and competencies.[23] It is proper to comment that, although there are general clinical guidelines to determine eligibility for bariatric surgery[24,25], a standardized protocol for screening evaluations has not yet been developed.[26] This is surprising because the importance of a thorough psychosocial evaluation before intervention and the ethical dilemmas this type of procedure raises.[27] The objective of the present narrative review was to discuss the main ethical challenges (autonomy, beneficence, non-maleficence, justice) in carrying out BS in adolescence. However, it is necessary to mention the importance of the Declaration of Helsinki, the Belmont Report, and the Nuremberg Code, which are documents and guidelines to consider to protect research participants and promote ethical practices.

ETHICAL ASPECTS OF BARIATRIC SURGERY

Autonomy

The ethical principle of autonomy refers to respecting the rights of each person to make their own decisions. Clinical research

specifies the principle of autonomy by obtaining informed, comprehensive, competent, and voluntary consent from the person participating in a treatment.[28] In the BS adolescent context, autonomy plays an important role. According to Moreira[29], adolescents are a developing population, and making informed decisions and exercising autonomy may be limited compared to adults. The decision to undergo BS is complex and carries long-term implications concerning lifestyle, health, and emotional well-being. Health professionals should carefully evaluate adolescents' decision-making capacity and consider their emotional maturity, understanding capacity, family support, and psychosocial support before recommending BS.[27] Physicians must be sure that adolescents are adequately informed of the risks, benefits, and alternatives of the procedure and feel empowered to participate actively in the decision-making process.[30] In some cases, it is necessary to involve parents or legal guardians in decision-making, especially if the adolescent does not have a complete understanding or if they have concerns about his or her ability to follow postoperative recommendations.[31] The goal is to find a balance between respecting the adolescent's autonomy and ensuring their long-term well-being and safety.[32]

The approach to autonomy in BS in adolescents must be individualized and multidisciplinary, involving health professionals, psychologists, social workers, and other specialists to guarantee a complete evaluation and provide the necessary support before and after the procedure.[30]

Beneficence

Beneficence refers to the ethical principle that involves acting for the benefit of others and seeking the well-being and improvement of their situation.[29] In the context of BS, it is related to improving the health and well-being of young patients suffering from severe obesity. BS is considered a treatment option for adolescents with severe obesity.[33] The main objective of BS in this group of patients is to achieve significant weight loss, improve associated comorbidities, and promote a better quality of life.[34] Surgery can offer relevant benefits for adolescents with severe obesity, as it can help reduce the risk of cardiovascular disease, type 2 diabetes, and other obesity-related health problems.[26] In addition to weight loss, BS can positively affect metabolic health, glucose control, blood pressure, and overall quality of life.[35] However, it is significant to note that beneficence must be balanced with other ethical aspects, such as respect for autonomy and justice. The decision to have a child or adolescent undergo BS should be based on a comprehensive evaluation considering potential benefits, risks, understanding ability, and ability to follow postoperative recommendations.[19] It is also crucial to have a multidisciplinary team that provides adequate support before, during, and after the procedure.[29,35] Currently, the treatment of this condition is multidisciplinary, including exercise, behavioral therapy, and dietary changes.[20] If the treatment provides actual benefits, all patients who need it should have easy access, which does not happen in practice; the biggest bioethical problem is the lack of allocation of resources for the procedure.[36]

Non-maleficence

Non-maleficence is an ethical principle that refers to the obligation not to cause harm to others or to minimize any possible damage.[37] In the context of bariatric, non-maleficence involves avoiding or reducing the risks and potential negative consequences arising from the surgical procedure.[36] BS is an invasive and complex treatment used for severe obesity in adolescents who have not responded to other, more usual treatment approaches.[26] Although it can offer significant benefits, such as weight reduction and improvement in associated comorbidities, it also carries certain risks and possible complications. Studies such as Beamish[27], mention that not all adolescents seem to benefit much from bariatric surgery, and we still cannot reliably identify those who will obtain the greatest benefit; that is why we must analyze all the consequences to minimize the risk of nutritional deficiencies and possible associated complications. For adolescents, there are additional considerations due to their stage of development and growth. BS can affect bone development, nutrient absorption and hormonal balance in this growing population.[33] Additionally, emotional and psychological challenges may arise related to physical changes and lifestyle adjustments after surgery.[38] Therefore, non-maleficence about BS in adolescents implies that healthcare professionals must carefully evaluate the potential risks and benefits of the procedure in each case. They should consider the young patient's maturity, ability to understand, and ability to adhere to postoperative recommendations and should take all necessary precautions to minimize risks and ensure patient safety.[39] The medical and multidisciplinary team must provide comprehensive care, including psychological and social evaluations, education on lifestyle changes, and appropriate follow-up to ensure the long-term safety and well-being of adolescents undergoing BS.[34] Ethical decision-making in this context must consider both potential benefits and risks to ensure that the principle of non-maleficence is respected.[30] Studies with more patients are necessary to identify factors associated with weight loss, changes in the metabolic profile, and changes in body composition. Good adherence to pre- and postoperative indications would be a determining factor for adequate weight loss, better metabolic results, and prevention of nutritional deficiencies in adolescents.[40] However, predictive factors for better adherence have not been identified.[41] Regarding quality of life, studies of up to 5 years of follow-up[42,43], show that, along with substantial and lasting weight loss, adolescents report marked and sustained improvement in weight-related quality of life, based on this review of the different clinical trials and systematic reviews, it is shown how BS, in any of its surgical modalities (Roux-en-Y gastric bypass, vertical sleeve gastrectomy or adjustable gastric band) can be efficient for the treatment of morbid obesity in adolescents, which, when

compared against adults, the results in the adolescent population are more significant, about a greater weight loss in the first year, which is maintained more when evaluated in the fifth year, and with a higher rate of resolution of metabolic and cardiovascular comorbidities.[44]

Justice

Justice is an ethical principle that refers to equity and fairness in distributing resources, benefits, and burdens in a society.[45] In the context of BS, the principle of justice applies to considering appropriate candidates for this type of treatment and how it is distributed fairly among them. BS in adolescents with severe obesity is a limited resource and is not free of risks and costs.[46] It is relevant that fair and equitable criteria are applied to select the proper candidates and ensure that resources are available to those who need them most.[35] Eligibility for adolescent BS is determined by the severity of obesity, the presence of related health conditions (comorbidities), and the lack of adequate response to other first-line treatment options.[26] Health professionals must evaluate potential candidates fairly and objectively, taking into account not only their Body Mass Index (BMI) but also their overall health, emotional maturity, and their ability to comply the requirements and postoperative recommendations.[30,33,34] Moreover, the principle of justice necessitates that access to BS is available and equitable for all individuals who meet the established criteria, regardless of their ethnic background, socioeconomic status, or any other personal characteristic.[29]

INFORMED CONSENT

The parents or legal guardians of all patients should give written informed consent; depending on age, the informed acceptance of the adolescent must be obtained separately from the parents to avoid misunderstandings.[31] The patient shall formally assess knowledge of the risks and benefits of the procedure and the importance of postoperative follow-up to ensure actual informed consent. The parental consent process should include a discussion of the hazards of adult obesity, available medical treatments, surgical alternatives, and the specific risks and outcomes of the proposed BS.[47] The acceptance and regulation of BS in adolescents vary between countries and religions; some allow this surgery in specific cases and under certain criteria, while others may have stricter restrictions or prohibit it; policies and regulations may change over time. It is relevant to consult up-to-date sources or contact health professionals in each specific country to obtain the latest information.

CONSENT TO THE PROCEDURE

The request for consent must include a series of aspects[19,48] which must contain the following:

1. Clear information about the diagnosis, including the degree of obesity and associated comorbidities.

2. The procedures available for adolescents, including visual material that describes the proceeding and allows understanding of the difference between them.

3. Risks and benefits of the surgical procedure.

4. Risks and benefits of not performing surgery.

5. Steps to follow after BS to achieve weight objectives and manage comorbidities solution. Emphasize adherence to nutritional guidelines and include the schedule of post-operative follow-ups.

6. Financial aspects of the procedure and follow-up, including the cost of complications.

7. Expected results after carrying out the procedure

Table 1 describes the criteria for patient selection and contraindications in BS.

COMPLICATIONS ASSOCIATED WITH BS IN ADOLESCENTS

Surgical, medical, and nutritional complications must be considered when evaluating the relevance of these procedures. Complications[16,19,49,50] associated with bariatric surgery in adolescents:

1. The surgical morbidity and mortality of BC are directly related to the experience of the surgical team and the hospital center.

2. In a 3-year follow-up, the Teen-LABSInge TH study reported severe complications in 9% of cases, which included intestinal obstruction, leaks, sepsis, and hemorrhage postoperative; minor complications reached 15%.

3. In a 5-year follow-up report after RYGB reported 1.9% mortality and 19% abdominal reinterventions, cholecystectomy represented almost half of these procedures (9.4%), followed by intestinal obstruction 2.5 % and herniorrhaphies 2.0%.

4. Late complications occurred in 10% to 15% of cases, which included hernias, cholelithiasis, intestinal obstruction, and stenosis.

5. Micronutrient deficiency (involving deficiency of calcium, vitamin D, iron, folic acid, vitamin B1, B6 and B12) is secondary to restriction of food intake and malabsorption, which constitutes the most important medium and long-term complication of BS and is directly related to inadequate adherence to both dietary and supplementation indications.

6. The disturbing symptoms of dumping (post gastrectomy) and other frequent intestinal movements, particularly after eating sweets, such as nausea, vomiting, and diarrhea, are recurrent in some patients undergoing Roux-en-Y gastric bypass.

LONG-TERM MONITORING

Any adolescent undergoing bariatric intervention needs long-term multidisciplinary follow-up after the intervention. Morbidly obese patients often have nutritional deficiencies, particularly in fat-soluble vitamins, folic acid, and zinc.[51] However, some complications have been reported, such as bone demineralization due to vitamin D deficiency[52] or hair loss secondary to zinc deficiency.[51] Long-term problems, such as changes in bone metabolism or neurological complications, should be carefully monitored.[47]

Table 1. *Criteria for patient selection and contraindication in bariatric surgery*[19,26,47]

Criteria for patient selection in BS	Conditions that contraindicate BS
• BMI > 97th percentile (or > 40 kg/m 2) with significant comorbidities (hypertension, insulin resistance, glucose intolerance, substantial impairment in quality of life or activities of daily living, such as dyslipidemia). • Documented attempt to lose weight through diet and lifestyle intervention. • 95% skeletal maturity determined by dual-energy X-ray absorptiometry scan and stability of psychological comorbidities. • The patient's desire to undergo surgery, appropriateness of prior weight loss attempts, and strong evidence of ability to comply with follow-up medical care, plus a demonstrated commitment to complementary lifestyle change and a stable psychosocial environment.	•Inability of the adolescent and, or caregivers to understand the risks and benefits of the procedure and comply with pre-and post-operative indications and long-term follow-up. • Medical, psychiatric, psychosocial, or cognitive condition of the adolescent that prevents adherence to the instructions. • Relative contraindications include untreated or uncompensated mental health disorders. • A medically correctable cause of obesity and a disability that could affect adherence to post-operative treatment, current pregnancy, or breastfeeding. • The associated risk-benefit analysis should include consideration of the potential long-term health risks of obesity.

Surgery does not mark the end of obesity treatment; on the contrary, it means the beginning of a period of nutritional and behavioral changes related to food education and exercise, with regular monitoring by a multidisciplinary team of health professionals.[11] One of the leading foundations of society is the person's dignity, and above all, it consists of seeing the human being in his specificity to respond appropriately to his needs. To achieve it, the primary benefice is respect. In clinical practice, it allows the patient to submit to the indications, knowing the risks and benefits and the direction of their choice for the option that best suits them, consciously considering the scientifically proven and ethically acceptable principles of medicine.[16]

Recent studies have demonstrated a significant improvement in post-operative quality of life after RYGB and laparoscopic adjustable gastric banding (LAGB) in adolescents, similar to adult cohorts.[53] Short-term data show that variables such as depression improve markedly in adolescents after BS[54], but long-term data have not been well studied. However, depression is not an exclusion criterion for BS.[55]

CONCLUSIONS

The BS treatment of morbid obesity in adolescents is a therapeutic modality that can be considered in a selected group with severe obesity, who meet the requirements and recommendations set out above, aiming to improve their quality of life, reducing metabolic risks, associated diseases, and early mortality. The available evidence has demonstrated the safety and effectiveness of these procedures in weight loss and the improvement of related diseases. However, these are invasive and irreversible procedures, with long-term results and complications largely unknown at these ages, so their indication, performance, and follow-up must be in the hands of qualified multidisciplinary teams dedicated to the comprehensive care of these patients to ensure their safety and expected results.

This management must involve a multidisciplinary team involving parents, family members, patients, and professionals to create a solid support network. Clinical trials should be conducted with larger cohorts, and the follow-up time should be longer, including early adulthood, to provide higher scientific

support for their application. Finally, it is relevant to highlight that BS should not be indicated as an isolated procedure, but rather be associated with interventions to strengthen permanent lifestyle changes.

REFERENCES

[1] Nittari G, Scuri S, Sagaro GG, Petrelli F, Grappasonni I. Epidemiology of obesity in children and adolescents. In: Michael SF, Stanislaw PS. Team Healthcare First edition. London 2021;149-62.

[2] Ward ZJ, Long MW, Resch SC, Giles CM, Cradock AL, Gortmaker SL. Simulation of growth trajectories of childhood obesity into adulthood. N. Engl. J. Med. 2017;377(22):2145-53.

[3] Jebeile H, Kelly AS, O'Malley G, Baur LA. Obesity in children and adolescents: epidemiology, causes, assessment, and management. Lancet Diabetes Endocrinol. 2022;10(5):351-65.

[4] World Health Organization: WHO [Internet]. Obesity and overweight WHO. 2021 - [cited 2024 Feb 20]. Avaiable from: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight .

[5] Apperley LJ, Blackburn J, Erlandson-Parry K, Gait L, Laing P, Senniappan S. Childhood obesity: A review of current and future management options. Clin. Endocrinol. (Oxf.) 2022;96(3):288-301.

[6] Méndez-Hernández LD Ramírez-Moreno E, Barrera-Gálvez R, Cabrera-Morales MDC, Reynoso-Vázquez J, Flores-Chávez OR, et al. Effects of Strength Training on Body Fat in Children and Adolescents with Overweight and Obesity: A Systematic Review with Meta-Analysis. Children (Basel) 2022;9(7):995.

[7] Donate FI, Sánchez-Oliver AJ, Benito PJ, Elvar JRH, Suarez-Carmona W, Butrageño J. Guide for the design of intervention programs in the population with obesity: Positioning Document of the Physical Exercise Group of the Spanish Society for the Study of Obesity (SEEDO). Challenges: new trends in physical education, sports and recreation. Retos 2023;(50):33-49.

[8] Chao AM, Wadden TA, Berkowitz RI. The safety of pharmacological treatment for pediatric obesity. Expert Opin. Drug Saf. 2018; 17(4):379-85.

[9] Coyote-Estrada N, Miranda-Lora AL. Tratamiento farmacológico de la obesidad en niños. Bol. Med. Hosp. Infant. Mex. 2008;65(6):547-67.

[10] Lennerz BS, Wabitsch M, Lippert H, Wolff S, Knoll C, Weiner R, et al. Bariatric surgery in adolescents and young adults—safety and effectiveness in a cohort of 345 patients. Inter. J. Obes. 2014;38(3):334-40.

[11] Khattab A, Sperling MA. Obesity in adolescents and youth: the case for and against bariatric surgery. J. Pediatr. 2019;207:18-22.

[12] Helmrath MA, Brandt ML, Inge TH. Adolescent obesity and bariatric surgery. Surg. Clin. N. Am. 2006; 86(2):441-54.

[13] Levine MD, Ringham RM, Kalarchian MA, Wisniewski L, Marcus MD. Is family-based behavioral weight control appropriate for severe pediatric obesity? Int. J. Eat. Disord. 2001;30(3):318-28.

[14] Sjöström L, Lindroos AK, Peltonen M, Torgerson J, Bouchard C, Carlsson B, et al. Lifestyle, diabetes, and cardiovascular risk factors 10 years after bariatric surgery. N. Engl. J. Med. 2004;351(26):2683-93.

[15] Palermo TM, Dowd JB. Childhood obesity and human capital accumulation. Soc. Sci. Med. 2012;75(11):1989-98

[16] Godoy CMDA, Magalhães GEJD, Santana MF, Correia SFBDM, Silva JJD. Bioethical analysis of indicating bariatric surgery for children and adolescents. Rev. Bioet. 2015;23:61-9.

[17] Inge TH, Garcia V, Daniels S, Langford L, Kirk S, Roehrig H. A multidisciplinary approach to the adolescent bariatric surgical patient. J. Pediatr. Surg. 2004;39(3):442-7.

[18] Ibele AR, Mattar SG. Adolescent bariatric surgery. Surg. Clin. North Am. 2011;91(6):1339-51.

[19] Amézquita MV, Baeza C, Ríos M, Francesetti V, Rybertt V, Gutiérrrez M. Bariatric surgery in adolescents with severe obesity: Recommendations from the Nutrition Branch, Chilean Society of Pediatrics. Rev. Chil. Pediatr. 2020;91(4):631-41.

[20] Xanthakos SA, Daniels SR, Inge, TH. Bariatric surgery in adolescents: an update. Adolecs. Med. Clin. 2006;17(3):589-612.

[21] Reyna VF, Farley F. Risk and rationality in adolescent decision making: Implications for theory, practice, and public policy. Psychol. Sci. Public Interest 2006;7(1):1-44.

[22] Chamay-Weber C, Narring F, Michaud PA. Partial eating disorders among adolescents: A review. J. Adolesc. Health 2005;37(5):416-26.

[23] Roberts CA. Physical and psychological effects of bariatric surgery on obese adolescents: A review. Front. Pediatr. 2021;8:591598.

[24] Pratt JSA, Roque SS, Valera R, Czepiel KS, Tsao DD, Stanford FC. Preoperative considerations for the pediatric patient undergoing metabolic and bariatric surgery. Semin. Pediatr. Surg. 2020;29(1):150890.

[25] Instituto Mexicano del Seguro Social [Internet]. Tratamiento Quirúrgico de la Obesidad Mórbida en la Población Adolescente. Guía de Referencia Rápida: Guía de Práctica Clínica. 2018 - [cited 2024 Feb 18] Available from: https://www.imss.gob.mx/sites/all/statics/guiasclinicas/050GRR.pdf

[26] Pratt JSA, Browne A, Browne NT, Bruzoni M, Cohen M, Desai A, et al. ASMBS pediatric metabolic and bariatric surgery guidelines, 2018. Surg. Obes. Relat. Dis. 2018;14(7):882-901.

[27] Beamish AJ, Reinehr T. Should bariatric surgery be performed in adolescents?. Eur. J. Endocrinol. 2017;176(4):D1-D15.

[28] Arguedas-Arguedas O. Basic elements of bioethics in research. Acta Med. Costaric. 2010;52(2):76-8.

[29] Moreira LAC. Ethics and psychosocial aspects in relation to children and adolescents candidates for bariatric surgery. Rev. Bioet. 2017; 25:101-10.

[30] Eisenberg D, Shikora SA, Aarts E, Aminian A, Angrisani L, Cohen RV, et al. 2022 American Society of Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) indications for metabolic and bariatric surgery. Obes. Surg. 2023;33:3-14.

[31] Katz AL, Webb SA, Committee on bioethics. Informed consent in decision-making in pediatric practice. Pediatrics 2016; 138(2):e20161484.

[32] Elkhoury D, Elkhoury C, Gorantla VR. Improving Access to Child and Adolescent Weight Loss Surgery: A Review of Updated National and International Practice Guidelines. Cureus 2023;15(4):e38117.

[33] Qin ZH, Yang X, Zheng YQ, An LY, Yang T, Du YL, et al. Quality evaluation of metabolic and bariatric surgical guidelines. Front. Endocrinol. (Lausanne) 2023;14:1118564

[34] Beamish AJ, Harper ER, Järvholm K, Janson A, Olbers T. Long-term outcomes following adolescent metabolic and bariatric surgery. J. Clin. Endocrinol. Metab. 2023;108(9):2184-92.

[35] Janson A, Järvholm K, Sjögren L, Dahlgren J, Beamish AJ, Gronowitz E, Olbers T. Metabolic and Bariatric Surgery in Adolescents: For Whom, When, and How?. Horm. Res. Pediatr. 2022;96(6):609-19.

[36] Hofmann B. Bariatric surgery for obese children and adolescents: a review of the moral challenges. BMC. Med. Ethics 2013;14:1-13.

[37] Zerón A. Beneficence and non-maleficence. Rev. Mex. Dental Assoc. 2019; 76(6):306-07.

[38] Aguilar AAT, Balarezo ELE. Literature review on definition, diagnostic criteria and treatment of metabolically healthy obese people. Lat. Sci. Rev. Scient. Multidiscp. 2022;6(6):2874-85.

[39] Martinelli V, Singh S, Politi P, Caccialanza R, Peri A, Pietrabissa A, et al. Ethics of Bariatric Surgery in Adolescence and Its Implications for Clinical Practice. Int. J. Environ. Res. Public Health 2023;20(2):1232.

[40] Ryder JR, Gross AC, Fox CK, Kaizer AM, Rudser KD, Jenkins TM, et al. Factors associated with long term weight loss maintenance following bariatric surgery in adolescents with severe obesity. Int. J. Obes. (Lond.) 2018;42:102-07.

[41] Hood MM, Corsica J, Bradley L, Wilson R, Chirinos DA, et al. Managing severe obesity: understanding and improving treatment adherence in bariatric surgery. J. Behav. Med. 2016;39(6):1092-103.

[42] Zeller M, Reiter- Purtill J. Psychosocial Issues in Adolescent Bariatric Surgery. In: Still C, Sarwer DB, Blankenship J. The ASMBS Textbook of Bariatric Surgery. Volume 2. New York: Springer. 2015;(2):65-73.

[43] Olbers T, Beamish AJ, Gronowitz E, Flodmark CE, Dahlgren J, Bruze G, et al. Laparoscopic Roux-en-Y gastric bypass in adolescents with severe obesity (AMOS): a prospective, 5 year, Swedish nationwide study. Lancet Diabetes Endocrinol. 2017;5:174-83.

[44] Coronado-Sarmiento JF, Palencia-Palencia JI, Barraza-Leones OC. Bariatric surgery in pediatrics, what impact does it have? Literature review. Rev. Colomb. Cir. 2022;37(2):259-79.

[45] López AL. Ethical and regulatory aspects of apheresis. Rev. Mex. Med. Trans. 2022;14(S1):s115-7.

[46] Klebanoff MJ, Chhatwal J, Nudel JD, Corey KE, Kaplan LM, Hur C. Cost-effectiveness of bariatric surgery in adolescents with obesity. JAMA. Surg. 2017;152(2):136-41.

[47] Nobili V, Vajro P, Dezsofi A, Fischler B, Hadzic N, Jahnel J, et al. Indications and limitations of bariatric intervention in severely obese children and adolescents with and without nonalcoholic steatohepatitis: ESPGHAN Hepatology Committee Position Statement. J. Pediatr. Gastroenterol. Nutr. 2015;60(4):550-61.

[48] Cabus L. Ethics and psychosocial aspects in child and adolescent candidates for bariatric surgery. Rev. Bioet. 2017;25:101-10.

[49] Michalsky M, Inge T. Adolescent Bariatric Surgery. In: Ninh TN, Robin PB, John MM, Jaime P, Raul JR. The ASMBS Textbook of Bariatric Surgery. Volume 1. New York: Springer. 2014;423-31.

[50] Inge TH, Courcoulas AP, Jenkins TM, Michalsky MP, Helmrath MA, Brandt ML, et al. Weight loss and health status 3 years after bariatric surgery in adolescents. N. Engl. J. Med. 2016;374:113-23.

[51] Mason ME, Jalagani H, Vinik AI. Metabolic complications of bariatric surgery: diagnosis and management issues. Gastroenterol Clin. North Am. 2005;34:25–33.

[52] Coates PS, Fernstrom JD, Fernstrom MH, Schauer PR, Greenspan SL. Gastric bypass surgery for morbid obesity leads to an increase in bone turnover and a decrease in bone mass. J. Clin. Endocrinol. Metab. 2004;89:1061-5.

[53] Loux TJ, Haricharan RN, Clements RH, Kolotkin RL, Bledsoe SE, Haynes B. Health-related quality of life before and after bariatric surgery in adolescents. J. Pediatr. Surg. 2008;43:1275–9.

[54] Zeller MH, Modi AC, Noll JG, Long JD, Inge TH. Psychosocial functioning improves following adolescent bariatric surgery. Obesity (Silver Spring) 2009;17:985-90.

[55] Akamine AM, Ilias EJ. Why are psychological evaluation and preparation necessary for the patient candidate for bariatric surgery? Rev. Assoc. Med. Bras. 2013; 59:316–7.