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Bariatric surgery in the elderly: A narrative review

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SUMMARY

Introduction: Due to population ageing, the elderly obese population is increasing. Bariatric surgery is the standard treatment option for morbid obesity nowadays, but there is some controversy regarding its routine indication in the elderly population.

Objective: To review the current evidence about bariatric surgery in the elderly.

Method: On-line search in the electronic databases Medline and Lilacs and compilation of the most significant data. The most relevant studies in the area over the past 16 years have been considered for this review.

Results: There was significant methodological heterogeneity in the studies found in the literature. Historically, old age was associated with poorer outcomes after bariatric surgery, both in regards to early postoperative complications and less weight loss, and resolution of comorbidities. More recent studies have shown better results, with morbidity and mortality comparable to those observed in younger populations. More cautious patient selection and the evolution of the surgical technique appear to be the cause of such improvement. An extended multidisciplinary team including a geriatrician and a social worker may also help to improve the preoperative approach.

Conclusion: Bariatric surgery is a safe and effective therapeutic option in the elderly population, but careful patient selection and specific preoperative assessment are mandatory.

Keywords: obesity, aged, health of the elderly, geriatrics, digestive system surgical procedures.

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INTRODUCTION

Population ageing, that is, a significant increase in life expectancy, is a worldwide phenomenon that was first detected in developed countries as early as the late 1970s and 1980s, and has also been affecting underdeveloped countries in the last decades. In Brazil, the elderly – people aged 60 years old or older – represent a population of 23.5 million people, more than double of the estimates reported in 1991.¹

The prevalence of obesity among the elderly has shown a steady and significant increase in the last years. In the United States of America, in individuals aged 60 to 69 years old, 42.5% of the women and 38.1% of the men are obese. Among those aged 70 to 79 years, 31.9% of the

women and 28.9% of men are also obese.² In a Brazilian population, Silveira et al.³ observed a 25.3% prevalence of obesity in elderly individuals, 30.8% among women and 17.4% among men. Several reasons are proposed for the higher prevalence of obesity among women, and the most significant are hormonal (mainly the menopause), occupational, and cultural factors, associated with a greater life expectancy.⁴ The frequency of obesity among the elderly was higher than the 12% overall prevalence observed in the general population in a recent survey conducted by the Brazilian Census Bureau (IBGE).⁴

Since bariatric surgery has become the standard treatment for morbid obesity, the possibility of performing this surgical modality in the elderly has raised some con-

cerns. Historically, in Brazil, surgery was not warranted for individuals aged 65 years or older.⁵ It was only in 2013 that the Federal Health Department authorized bariatric surgeries to be performed in individuals above this age limit. Currently, there is not an upper limit for age. The indications for surgery are equal to those in younger individuals: body mass index (BMI) equal or higher than 40 kg/m² or equal or higher than 35 kg/m² associated with obesity-related comorbidities. The same government ordinance that established that there would not be an upper age limit for surgery also states that any clinical condition that could enhance the surgical risk to prohibited levels must be considered prior to the procedure.⁶

Although surgery is currently the best treatment option for morbid obesity, the outcomes in the elderly were not so positive in the first published reports, leading to some controversy. Our study sought to review the past and current evidence on bariatric surgery in the elderly and evaluate a possible specific preoperative approach to this group.

METHOD

A review of the literature was conducted through an online search for the following Medical Subject Heading (MeSH) terms in English: bariatric surgery; aged; health of the elderly (Medline search via PubMed); and the following MeSH/DeCS terms in English, Portuguese, and Spanish: bariatric surgery/cirurgia bariátrica/cirurgia bariátrica; aged/idoso/anciano; health of the elderly/saúde do idoso/salud del anciano (Lilacs search via Bireme). We included original studies that reported on population studies about the effects of several modalities of bariatric surgery on elderly individuals. All of the articles were screened based on title and abstract. Full-text articles were obtained from journals available from the Commission for Improvement of Higher Education Personnel (Comissão de Aperfeiçoamento de Pessoal de Nível Superior – CAPES) Foundation (Ministry of Education, Brazil) website. Articles that did not provide a full version were requested directly to the authors. Articles presenting potentially relevant studies were read and analyzed to assess the inclusion criteria. We excluded articles that consisted of *in vitro* or animal studies, articles in which the participants' characteristics did not match those mentioned above, poster session abstracts, narrative review articles and other types of publications (non-standard bariatric surgical techniques; studies without appropriate follow-up; or studies with critical methodological issues). Other papers were used for contextualization and discussion.

RESULTS

Many articles were found in duplicity in both databases, leading to a final count of 13 studies eligible for our review. Table 1 summarizes the main studies selected for this review.

TABLE 1 Database search results for bariatric surgery on the elderly on October 10th, 2016.

Electronic databases	Search strategies	Results
Medline (PubMed)	((Bariatric surgery) AND ((Aged) OR (Health of the Elderly)))	10 retrospective cohorts 3 systematic reviews
Lilacs (Bireme)	((Bariatric surgery) OR (Cirurgia Bariátrica) OR (Cirurgia bariátrica)) AND ((Aged) OR (Anciano) OR (Idoso)) OR ((Health of the Elderly) OR (Salud del Anciano) OR (Saúde do Idoso))	6 retrospective cohorts 3 systematic reviews

DISCUSSION

A recurring problem in regards to the available evidence of bariatric surgery in the elderly is the lack of homogeneous standardization and method. First, the age limit to consider an individual as aged is variable, with some articles stating ages as low as 50 years and others as high as 70 years. Furthermore, most studies were database analyses, which were not prospectively assessed and enrolled individuals who underwent several different techniques of bariatric surgery. Despite the overall poor quality, however, there was a large number of individuals enrolled in these studies, leading to statistical significance in spite of the methodological limitations.

Historically, population studies published in the 2000s about bariatric surgery in older individuals reported significantly worse outcomes in regards of morbidity and mortality compared with younger subjects. Sugerman et al.,⁷ in a database analysis of 80 consecutive individuals aged 60 years or older who underwent varied bariatric surgical techniques, observed a higher prevalence of preoperative comorbidities; the mean excess weight loss and resolution of comorbidities were lower than those observed in younger populations; there were no perioperative deaths. Flum et al.,⁸ in a retrospective cohort study enrolling 16,155 individuals who underwent varied bariatric procedures, reported higher perioperative mortality in individuals aged 65 years or older (4.8% versus 1.7% in younger individuals), as well as higher one-year mortality (11.1% versus 3.9%, respectively), concluding that patients aged 65 years or

older had a substantially higher risk of death within the early postoperative period than younger patients. Dunkle-Blatter et al.,⁹ in a single-center retrospective analysis enrolling 1,065 patients, reported that the 90-day operative mortality rate was 1.64% in the older group versus 0.53% for the younger group. Livingston et al.,¹⁰ in a database analysis enrolling 1,067 consecutive individuals who underwent gastric bypass surgery, identified older age as a predictor of mortality, since they found that patients older than 55 years had a threefold higher mortality from surgery than younger patients, although the complication rate, 5.8%, was the same in both groups, suggesting that older patients lack the reserve to recover from complications when they occur. In a database analysis conducted by Varela et al.,¹¹ the authors observed that, compared with nonelderly patients, elderly patients who underwent bariatric surgery had more comorbidities, longer lengths of stay, more overall complications (18.9% vs. 10.9%), pulmonary complications (4.3% vs. 2.3%), hemorrhagic complications (2.5% vs. 1.5%) and wound complications (1.7% vs. 1.0%); the in-hospital mortality rate was also significantly higher in the elderly group (0.7% vs. 0.3%). A Brazilian retrospective study carried out by Pajeccki et al.¹² revealed that surgical morbidity (26% vs. 37%, respectively) and mortality (0 vs. 12.5%, respectively) were higher in patients over 65 years, and this group had the same benefits observed in patients aged less than 65 years in regards to weight loss and comorbidity control.

More recently, studies are showing a trend toward improvement of the surgical outcomes of bariatric surgery in the elderly. Dorman et al.,¹³ in a database analysis enrolling 48,378 individuals who underwent varied bariatric surgical techniques, observed that patients aged 65 years or older presented a non-statistically significant trend toward higher mortality and did not experience higher risk of major complications for either open or laparoscopic procedures; nonetheless, they were more likely to experience prolonged length of stay. Morgan and Ho,¹⁴ in a retrospective cohort study enrolling 12,062 individuals who underwent bariatric surgery, observed that 18.1% of all the procedures were performed in patients \geq 55 years old; older bariatric patients were statistically more likely to require longer hospital admissions, have more postoperative complications and require intensive care admissions compared to patients $<$ 55 years old; however, 30-day (no deaths in the older cohort) and long-term mortality rates did not differ from those observed in younger individuals, suggesting that bariatric surgery may confer health benefits to carefully selected obese older patients who cannot achieve weight loss by other means. Batsis et al.,¹⁵ in a retrospective population-based study that analyzed 40 consecutive individuals aged 60 years or older

who underwent bariatric surgery, observed a perioperative mortality of 2.5%, along with considerable weight loss, improvement in cardiovascular risk factors, and decrease in prevalence of metabolic syndrome, considering it to be an effective treatment in this population. Gebhart et al.,¹⁶ in a comparative database analysis, observed that the elderly represented 2.7% of all bariatric surgeries in the 1999-2005 period, with an increase to 10.1% in the 2009-2013 period; in-hospital mortality was 0.3% for the nonelderly and 0.7% for the elderly in 1999-2005, whereas in 2009-2013, in-hospital mortality had decreased to 0.1% for the nonelderly and 0.05% for the elderly, concluding that better patient selection and evolution of the surgical technique may explain this significant improvement. In a systematic review enrolling 1,206 individuals aged 55 years or older, Lynch and Belgaumkar¹⁷ observed that the 30-day mortality rate was 0.3% and 0.18% for laparoscopic Roux-en-Y gastric bypass (LRYGB) and laparoscopic adjustable gastric banding (LAGB), respectively; meta-analyses of BMI reduction indicated sustained and clinically significant BMI reduction for both RYGB (mean percentage of excess weight loss at 1 year, 72.6%) and LAGB (mean percentage of excess weight loss at 1 year, 39.1%). Another systematic review conducted by Giordano and Victorzon,¹⁸ encompassing 8,149 patients aged 60 years or older, observed a pooled mortality of 0.01% in the 30-day postoperative period and a pooled overall complication rate of 14.7%, concluding that outcomes and complication rates of bariatric surgery in patients older than 60 years are comparable to those in younger populations, despite the type of procedure performed. In both systematic reviews, the authors comment that the heterogeneity of the studies preclude further conclusions, but reveal a newer trend toward safety regarding bariatric surgery in the elderly, and proposing that a major factor related with these outcomes is a more efficient and careful preoperative selection of the individuals who are eligible for surgery. A systematic review carried out by Chow et al.¹⁹ including 1,835 individuals who underwent RYGB found a mean excess weight loss of 66.2%, with mean 30-day mortality at 0.14%, and mean total post-operative complication rate at 21.1%, with wound infections being the most common (7.58%) followed by cardiorespiratory complications (2.96%). The authors concluded that bariatric surgery is effective in producing marked weight loss in patients \geq 65 years with an acceptable safety profile. Table 2 summarizes the main reported outcomes of the above cited studies and their respective levels of evidence according to the Oxford Centre for Evidence-based Medicine.²⁰ An important question addressed in all of the systematic reviews is that prospective controlled studies are necessary to lead to evidence of better quality.

TABLE 2 Main results of bariatric surgery in the elderly reported in the literature.

	Sugerman et al. ⁷	Flum et al. ⁸	Dunkle-Blatter et al. ⁹	Livingston et al. ¹⁰	Varela et al. ¹¹	Pajecki et al. ¹²	Dorman et al. ¹³	Morgan et al. ¹⁴	Batsis et al. ¹⁵	Gebhart et al. ¹⁶	Lynch and Belgaumkar ¹⁷	Giordano and Victorzon ¹⁸	Chow et al. ¹⁹
Study design	Retrospective cohort	Retrospective cohort	Retrospective cohort	Retrospective cohort	Retrospective cohort	Retrospective cohort	Retrospective cohort	Retrospective cohort	Retrospective cohort	Retrospective cohort	Systematic review	Systematic review	Systematic review
Level of evidence	2b	2b	2b	2b	2b	2b	2b	2b	2b	2b	2a	2a	2a
N	Elderly: 80	Overall: 16,155 Elderly: 1,517	Overall: 1,065 Elderly: 76	Overall: 1,067 Elderly: 113	Overall: 49,275 Elderly: 1,339	Overall: 46 Elderly: 48,378	Overall: 1,994 Elderly: 12,062	Overall: 2,179 Elderly: 40	Overall: 60,709 Elderly: 6,105		Elderly: 1,206	Elderly: 8,149	Elderly: 1,835
Surgical morbidity	Minor: NR Major: 8.7%	NR	Minor: 26.2% Major: 4.9%	Minor: NR Major: 5.8%	Overall: 18.9%	Overall: 30.4%	Minor: NR Major: 4.3%	Overall: 12%	NR	Major: 1.54% RYGB: 1.29% SG: 0.66%	NR	Overall: 14.7%	Overall: 21.1%
Perioperative mortality	0	4.8%	1.6%	3.5%	0.7%	4.3%	0.4%	0	2.5%	RYGB: 0.14 SG: 0.12 LABG: 0	LABG: 0.3% LRYGB: 0.18%	LABG: 0.01% LRYGB: 0.18%	0.14%

N: number of individuals; NR: not reported; LAGB: laparoscopic adjustable gastric banding; LRYGB: laparoscopic gastric bypass; SG: sleeve gastrectomy; RYGB: Roux-en-Y gastric bypass.

In regard to the selection criteria for bariatric surgery in the elderly, there is no universal or standard protocol of preoperative evaluation. The standard general assessment may be insufficient for a population with specific needs and concerns, such as that of older individuals. Batsis and Dolkart²¹ proposed an individualized approach to older candidates to bariatric surgery that encompasses and contemplates aspects and domains that are not so prominent in younger individuals. These authors propose that older candidates should be evaluated by an extended multidisciplinary team that would include a geriatrician and a social worker, and that the preoperative assessment must incorporate five specific topics for this population: 1) evaluation of functional status; 2) assessment of frailty; 3) cognitive assessment; 4) identification of depression; 5) social support and discharge planning. Their proposal is based on the fact that worse surgical outcomes are mostly related to impaired functional status, presence of frailty, delirium that occurs in previously cognitively impaired individuals, presence of depression and other psychiatric conditions that may be underestimated prior to surgery, and the unavailability of caretakers and ideal housing conditions for these individuals after surgery. Experienced geriatricians and social workers may help to achieve a more thorough preoperative assessment and to select only individuals eligible for surgery, reducing any avoidable risks. This group of individuals, due to specific characteristics and possible major risks, should undergo surgery in high-volume centers.

The evolution of surgical technique, especially the development of minimally invasive approaches, constitutes an important factor in the improvement of the surgical outcomes over time, along with cautious and careful patient selection and preoperative assessment.

CONCLUSION

Bariatric surgery has become a safe and effective therapeutic option for obesity in the older population; however, thorough patient selection and a specific preoperative assessment are key points to lead to satisfactory outcomes.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

RESUMO

Cirurgia bariátrica no idoso: uma revisão narrativa

Introdução: Em virtude do envelhecimento populacional, a população obesa idosa também está aumentando. A

cirurgia bariátrica é o tratamento padrão-ouro para obesidade mórbida atualmente, porém sua realização rotineira em idosos ainda é controversa.

Objetivo: Revisar a literatura atual sobre a cirurgia bariátrica em idosos.

Método: Revisão *on-line* das bases de dados eletrônicas Medline e Lilacs e compilação dos dados mais significativos. Os estudos mais relevantes na área nos últimos 16 anos foram considerados para esta revisão.

Resultados: Houve grande heterogeneidade metodológica nos estudos encontrados. Historicamente, a idade avançada estava associada a resultados inferiores após a cirurgia bariátrica, em relação tanto a complicações pós-operatórias quanto à perda de peso e resolução de comorbidades. Estudos mais recentes têm mostrado resultados melhores, com morbidade e mortalidade comparáveis às observadas em indivíduos mais jovens. A seleção criteriosa de pacientes e a evolução da técnica cirúrgica parecem estar ligadas a essa melhora. Uma equipe multidisciplinar expandida, com geriatra e assistente social, pode também colaborar para uma melhor abordagem pré-operatória.

Conclusão: A cirurgia bariátrica é uma opção terapêutica segura e efetiva na população idosa, mas uma seleção criteriosa de pacientes e avaliação pré-operatória específica precisam ser realizadas.

Palavras-chave: obesidade, idoso, saúde do idoso, geriatria, procedimentos cirúrgicos do sistema digestório.

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