INJ INTERNATIONAL NEUROUROLOGY JOURNAL

Medical care of infection patients undergoing weight loss surgery and laparoscopy, relying on cardio-pulmonary & Neurological care: A systematic review

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Abstract

The present study has systematically examined the medical care of patients undergoing weight loss surgery and laparoscopy, relying on cardiopulmonary care. In this study, 80 articles were examined by searching the words "systematic review of medical care", "patients undergoing weight loss surgery" and "laparoscopy based on cardiopulmonary care". Obesity is one of the biggest human problems in the new age. In the heart failure guidelines published in 2013 by the college of cardiology and the American heart association, it was announced that obesity is considered as the starting point of heart failure. In this guide, obesity is mentioned as a medical condition that by itself puts a person in stage a of heart failure. Stage an according to this guide refers to the stage in which the obese person is without structural heart disease and without symptoms of heart failure. This means that even if an obese person has no signs or symptoms of heart failure, they are at risk stage a due to their obesity. The results showed that laparoscopic surgery is a minimally invasive method that uses small incisions and specialized tools and cameras to perform various surgeries, including weight loss surgery. The camera allows the surgeon to view the inside of the body on a monitor, providing a detailed view of the organs and tissues being operated on. Compared to traditional open surgery, laparoscopic surgery has many advantages. These benefits include: less pain, smaller scars, shorter hospital stays, and faster recovery time. Laparoscopy can be used to perform a wide range of surgeries, including gallbladder removal, hernia repair, and weight loss surgery. Although laparoscopic surgery may not be suitable for everyone, it is a safe and effective option for many patients. This procedure has become a popular choice among surgeons and patients. Usually, in laparoscopic surgery, patients can return to their normal activities within one or two weeks

Key words: Medical Care, Patient, Weight Loss Surgery, Laparoscopy, Cardiopulmonary Care.

Introduction

Gastric ring is one of the types of slimming operations that seems somewhat simpler than others [1-3]. In gastric banding or gastric banding, a ring is placed in the upper part of the stomach around the stomach [4-6]. The function of this ring is to narrow the entrance of the stomach to reduce food consumption and feel fuller [7-9]. Like other types of slimming surgery, gastric banding is performed if a person suffering from excessive obesity has not succeeded after trying to lose weight with exercise and diet. In addition, the applicant for this procedure must suffer from problems and diseases related to obesity [10]. Performing slimming procedures only if it is recommended that there is no other solution to treat the person's obesity and it is considered a serious threat to the person's health. If you are planning to perform gastric banding or gastric banding, you should first consult with a gastroenterologist (Figure 1) [11].

ISSN:2093-4777 | E-ISSN:2093-6931
DOI: 10.5123/inj.2024.2.inj105
Vol. 28 Iss. 2 (2024)

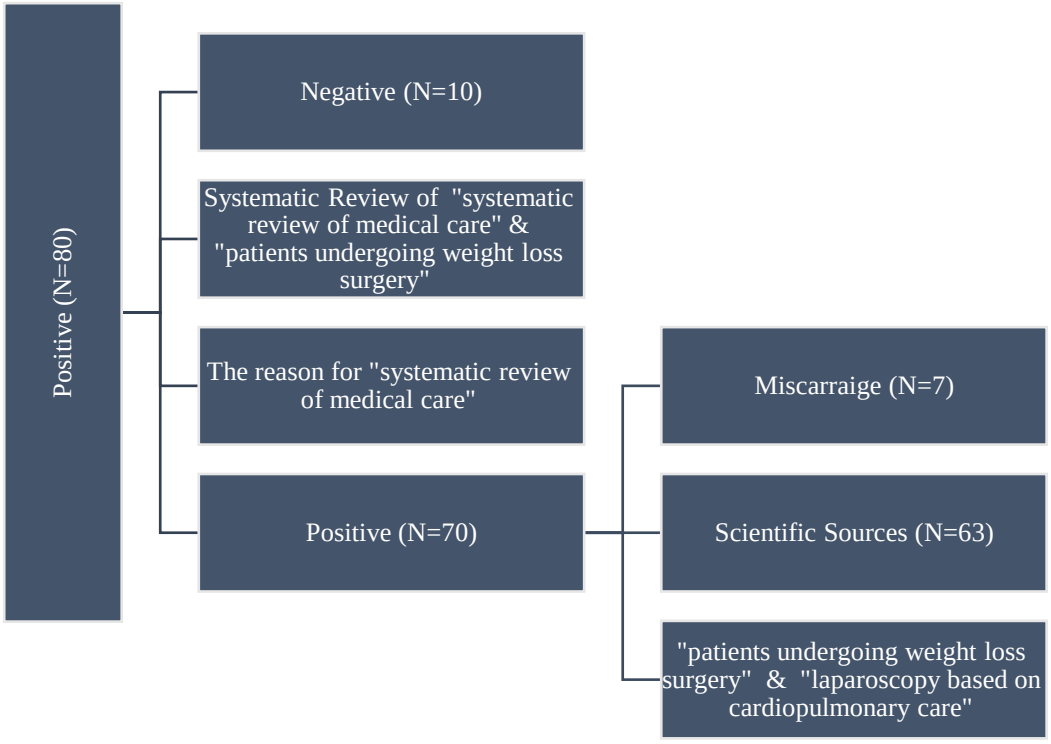

Figure 1. Flow chart of included subjects

What is gastric banding?

Gastric band is a type of weight loss surgery that involves placing an adjustable silicone band around the uppermost part of the stomach, creating a small pouch above the band with the bulk of the stomach underneath. Stomach banding is done to reduce the size of the stomach and limit the food consumed [12]. After placing the ring, he connects a tube to the ring. The tube is accessible through an opening under the skin. Using this valve [13], the surgeon injects a saline solution into the ring to adjust it. By applying adjustments, the surgeon can change the tightness of this ring. Having a smaller stomach pouch reduces the amount of food the stomach can hold [14]. As a result, a person feels full after consuming a small amount of food. The advantage of this slimming procedure is that it allows the body to digest food normally without malabsorption [15].

Who can perform gastric bypass surgery?

In the past, only people with a body mass index (BMI) greater than 35 were suitable for this operation. Of course, for some people with a BMI of around 30 to 35 [16], this surgery was performed in case of obesity-related problems such as diabetes, high blood pressure, and sleep apnea. This was due to the high risk of side effects. However, advances in surgical techniques have increased the safety of this operation and these criteria are no longer very useful. Like other types of slimming surgery [17], gastric banding is performed if a person suffering from excessive obesity has not succeeded after trying to lose weight with exercise and diet [18]. In addition, the applicant for this procedure must suffer from problems and diseases related to obesity.

How much weight do you lose with gastric banding?

One of the most important things about weight loss with gastric band surgery is that you lose weight over time and in a consistent pattern [19]. In this case, you will not be harmed. Usually, people who perform this surgery lose half of their extra weight after a while [20]. This is an average and regular weight loss of half to one kilo per week [21]. This mode of losing weight is a relatively low-risk and ideal method.

Discussion

Obese people are more at risk of heart disease than anyone else [22-24]. As the weight increases, the heart needs more activity and pumping to supply blood to bulky and extra tissues, and this causes an increase in blood pressure [25]. Over time, this high pressure can cause the heart to enlarge. Unlike other muscles in the body, when the heart gets bigger, it becomes less efficient and is practically unable to perform its roles properly [26].

Other heart conditions and diseases that are associated with obesity include:

- ✓ Increase blood cholesterol and triglycerides [27].
- ✓ Reducing HDL cholesterol, which is known as good cholesterol, reduces the risk of stroke and heart disease [28].
- ✓ An increase in LDL cholesterol, also known as bad cholesterol. This cholesterol builds up in the walls of the arteries and increases the risk of heart disease [29].
- ✓ Increased blood pressure [30].
- ✓ Increased risk of heart attack, stroke and other heart disease [31].

Failure, the most important heart disease related to obesity

We have two types of heart failure. One is systolic heart failure and the other is diastolic heart failure. In systolic failure, the heart does not pump blood normally [32]. In this situation, the percentage of blood that is removed with each contraction of the heart muscle decreases. In other words, pumping decreases and is incomplete [33]. In diastolic failure, the percentage of blood discharge from the heart is normal, but due to the stiffness of the heart muscle, this organ still cannot properly pump blood to the body [34].

Bariatric surgery by laparoscopic method

Unlike open bariatric surgery that requires large incisions, laparoscopic bariatric surgery only requires small incisions. Small incisions mean less pain, less scarring and shorter recovery time. However, laparoscopic weight loss surgery is not without risks [35]. As with any surgery, there is a risk of bleeding, infection, and adverse reactions to anesthesia.

Laparoscopic bariatric surgery is generally recommended for these people:

- ✓ Patients with a body mass index (BMI) of 40 or higher [36].
- ✓ Patients with a BMI of 35 or higher with one or more obesity-related conditions such as diabetes, high blood pressure, or sleep apnea [37].
- ✓ Also, this operation can be performed in some people with a BMI above 30 and with the discretion of the doctor [38].

Benefits of laparoscopic weight loss surgery

Laparoscopic weight loss surgery has many benefits for people struggling with obesity and related diseases [39]. Here are some of the benefits of laparoscopic bariatric surgery:

1- Minimally invasive: laparoscopic weight loss surgery is a minimally invasive procedure. This means it involves small incisions and specialized tools. These small incisions result in less pain, minimal scarring, and faster recovery times compared to open or traditional weight loss surgeries.

2- Reducing the risk of complications: Compared to open weight loss surgeries, laparoscopic weight loss surgery has a lower risk of complications such as infection [40], bleeding, and adverse reactions to anesthesia [41].

3- Improving the quality of life: Obesity can have a significant impact on the quality of life of people. Laparoscopic bariatric surgery can improve the quality of life of people struggling with obesity [42].

4- Long-term weight loss: Laparoscopic weight loss surgery can lead to significant long-term weight loss, which can improve a person's health and reduce the risk of obesity-related diseases such as diabetes, high blood pressure, and sleep apnea [43].

5- Increasing self-esteem: Losing weight can increase people's self-esteem and self-confidence, which can have a positive effect on their mental health and overall well-being [44].

The difference between laparoscopy and laparotomy

Laparoscopy and laparotomy (open surgery method) are two different surgical methods that are used for various medical surgeries including weight loss surgery. Here are the main differences between laparoscopy and laparotomy:

1- Incision size: One of the main differences between laparoscopy and laparotomy is the incision size. Laparoscopy involves making several small incisions (usually less than 1 cm) in the abdomen, while laparotomy involves making one large incision (a few centimeters long) in the abdomen.

2- Vision: During laparoscopy, a small camera (laparoscope) is inserted into the abdomen, which provides the surgeon with a clear view of the surgical site [45]. During laparotomy, the surgeon has a direct view of the surgical site through the large incision.
3- Tissue damage: Laparoscopy is a minimally invasive procedure that causes less tissue damage compared to laparotomy. A laparotomy involves cutting multiple layers of tissue, which can result in more tissue damage and a longer recovery time [46].
4- Pain and scars: Laparoscopy usually involves less pain and scars compared to laparotomy. The small incisions used in laparoscopy usually cause less pain, and the scars are smaller and less visible compared to the large scar left by laparotomy [47].
5- Recovery time: since laparoscopy has less tissue damage, it usually has a shorter recovery time compared to laparotomy. Patients who undergo laparoscopy can usually return to normal activities within a few days to a week, while patients who undergo laparotomy may need several weeks or even months to fully recover [48].

Is laparoscopic weight loss surgery for everyone?
Patients who have had previous abdominal surgeries, or have certain medical conditions such as bleeding disorders or heart and lung disease, may not be good candidates for laparoscopic surgery. Open surgery is a more traditional procedure that involves making a larger incision to access the area to be operated on [49]. This method may be a better option for some patients, such as those with extensive scar tissue or complex anatomy, but it usually requires a longer hospital stay and longer recovery time than laparoscopic surgery.

What is a laparoscope in weight loss surgery?
A laparoscope is a long, thin tube with a camera at the end. This camera transmits images from inside the abdomen to a video screen. The surgeon uses these images to guide other instruments that are inserted through small incisions in the abdomen [50]. Laparoscope instruments are used to make incisions and suture the tissue. They can also be used to remove tissue. Laparoscopy instruments are usually made of metal and are very thin. Because they are thin, they can be inserted through small incisions in the abdomen. Laparoscope is a minimally invasive laparoscopic surgery tool [51].

What are the types of laparoscopic slimming surgery?
Different types of laparoscopic weight loss surgery include: laparoscopic gastric bypass and laparoscopic gastric sleeve [52].

Who are the right candidates for laparoscopic weight loss surgery?
- ✓ Suitable candidates for laparoscopic weight loss surgery are usually people who are severely obese and have tried other weight loss methods [53].
- ✓ This surgery can also be done for people who have a BMI of 35 or higher. Also, diseases related to obesity, such as type 2 diabetes, are useful.
- ✓ If the bariatric surgeon deems it appropriate, people with a BMI above 30 can also perform this operation under certain conditions [54].

What are the risks of laparoscopic weight loss surgery?
The risks of laparoscopic weight loss surgery are generally low. Some of the possible risks are: infection, bleeding, leakage from the stomach or intestines, damage to other organs, death [55].

How long is the recovery period for laparoscopic weight loss surgery?
Recovery time for laparoscopic weight loss surgery is usually shorter than traditional open surgery. Most patients can go home from the hospital within a day or two. Of course, it will take one to two weeks for them to fully recover and be able to return to work [56-58].

What are the long-term benefits of laparoscopic bariatric surgery?
Laparoscopic bariatric surgery can cause significant weight loss and improve health problems associated with obesity [59-61]. Also, this surgery can help improve diabetes and other chronic diseases.

How can weight loss surgery help improve cardiovascular disease?
It should be noted that the exact mechanisms of weight loss to help improve cardiovascular disease are still being investigated [62-64]. However, it is believed that weight loss can be effective in improving these diseases in the following ways:

ISSN:2093-4777 | E-ISSN:2093-6931
DOI: 10.5123/inj.2024.2.inj105
Vol. 28 Iss. 2 (2024)

1- The effect of bariatric surgery on blood pressure: High blood pressure is a common disease in obese people and an important risk factor for cardiovascular diseases. Studies have shown that bariatric surgery can lead to a significant reduction in blood pressure and thus improve cardiovascular outcomes [65-67].

2- Effects of bariatric surgery on harmful fats: Abnormal fat, characterized by high levels of cholesterol and triglycerides, is usually seen in obese people [68-70]. Bariatric surgery has been found to positively affect the lipid profile, leading to lower cholesterol and triglyceride levels, while increasing levels of the good blood cholesterol, HDL [71].

3- Blood sugar control and bariatric surgery: Obesity is strongly associated with insulin resistance and type 2 diabetes, both of which increase the risk of cardiovascular disease. Bariatric surgery has shown significant effects on blood sugar control [72-74], with many patients experiencing improvements in diabetes or significant improvements in blood sugar levels. With the improvement of diabetes, the possibility of cardiovascular diseases also decreases [75].

4- Reducing inflammation and obesity surgery: Chronic inflammation is one of the characteristics of obesity and plays a role in causing cardiovascular diseases. It has been found that bariatric surgery reduces inflammation markers in the body and with this method leads to a reduction in the risk of cardiovascular diseases [76].

Changes in the structure and function of the heart

Obesity can lead to structural and functional changes in the heart. For example, it can cause left ventricular hypertrophy and heart dysfunction. Studies have shown that bariatric surgery can reverse these changes and thus improve the structure and function of the heart [77].

Long-term effects of bariatric surgery on cardiovascular health

Long-term studies evaluating the effects of bariatric surgery on cardiovascular health have shown promising results. A decrease in mortality due to cardiovascular diseases, a decrease in the incidence of heart failure, and an overall improvement in the condition of this system have been observed in patients who have undergone bariatric surgery [78].

Types of weight loss surgery to improve heart function and reduce heart disease

A bariatric surgeon treats obesity with the help of a number of special techniques and methods. Most of these procedures are performed with the help of laparoscopy [79], which is a very safe and minimally invasive method [80].

Table 1. Forest plot showed the medical care of patients undergoing weight loss surgery and laparoscopy, relying on cardio-pulmonary care

	Study	Year	Proportion	Wight 98%	Weight %
1	Hastings et al.	2023	0.64	[0.11 – 1.72]	3.02
2	Watts et al.	2022	0.52	[0.42 – 2.11]	4.00
3	LeGrand et al	2022	0.96	[0.44 – 1.02]	6.32
4	Hung et al	2023	0.65	[0.25 – 0.98]	5.12
Heterogeneity t^2=0.00, I^2= 0.00, H^2=0.9			0.55	[0.34 – 0.58]	1.23
Test of Θ= Θ, Q (4) =3.45, P= 0.77					
1	Hosseini et al.	2021	0.56	[0.11 – 0.66]	1.55
2	Ibrahim et al.	2020	0.66	[0.15 – 0.48]	4.33
3	Kalantari et al.	2020	0.48	[0.19 – 0.55]	6.77
4	Rothan et al.	2020	0.64	[0.17 – 0.29]	3.03

Heterogeneity t^2=0.05, I^2= 0.07, H^2=0.78				0.82	[0.03 – 0.32]	
Test of Θ= Θ, Q (4) =3.01, P= 0.11						
1	Michler et al.	2021		0.97	[0.39 – 1.06]	3.11
2	Chiusano et al.	2020		0.95	[0.54 – 1.02]	6.05
3	Delin et al.	2020		0.43	[0.63 – 1.01]	4.06
4	Gadlage et al.	2010		0.51	[0.25 – 1.08]	7.03
Heterogeneity t^2=0.12, I^2= 0.01, H^2=0.99				0.68	[0.22 – 1.07]	6.03
Test of Θ= Θ, Q (4) =1.45, P= 0.14						
1	Samiei et al.	2021		0.84	[0.27 – 1.08]	6.08
2	Stoessl et al.	2020		0.76	[0.52 – 0.22]	5.82
3	Uzunova et al.	2020		0.11	[0.54 – 0.89]	5.85
4	Wang et al.	2020		0.39	[0.12 – 0.99]	6.09
Heterogeneity t^2=0.21, I^2= 0.04, H^2=0.39				0.77	[0.19 – 1.00]	
Test of Θ= Θ, Q (4) =3.35, P= 0.34						

Conclusion

Since most slimming surgeries such as gastric sleeve reduce the volume and size of the stomach, as a result, patients are required to consume a very limited and nutritious diet. These foods are often low in sugar and low in fat, which play an important role in treating and reducing heart disease.

1- Background: due to the use of laparoscopy instead of laparotomy, it seems necessary to know the pathophysiological effects and complications caused by it.

2- Objective: This study was conducted to investigate the effects of laparoscopy on the vascular and respiratory system.

3- Materials and methods: 50 referring patients were subjected to general anesthesia to close the fallopian tubes by laparoscopic method. In equal conditions and before pneumoperitoneum, systolic blood pressure, diastolic blood pressure and heart rate of patients were measured and blood gas analysis was done. After the creation of pneumoperitoneum, when the intra-abdominal pressure reached 20 mm Hg, the above parameters were again measured and compared.

4- Findings: After pneumoperitoneum, the average systolic blood pressure increased by 18.7% and the average diastolic blood pressure increased by 19.7%, which was statistically significant, but no change in heart rate was observed. In the blood gas analysis, respiratory acidosis was observed, the mean arterial blood oxygen pressure decreased by 27.6% and the mean arterial blood oxygen saturation decreased by 1.55%, which was statistically significant.

5- Conclusion: increasing the minute volume will prevent the occurrence of respiratory acidosis and hypoxia, and this, together with the control of intra-abdominal pressure, will partially prevent the occurrence of changes in the hemodynamic system.

Laparoscopy is the least invasive procedure that is performed as a diagnostic tool and a surgical treatment to examine and examine the abdominal and pelvic organs or chest, head or neck. By performing laparoscopy, tissue samples can also be collected for sampling. Also, its combined use with other treatment methods can also play a role in the treatment of malignancies. This method can also be used for some procedures related to the cardiovascular system. In the field of gynecology, laparoscopy is widely used to examine the external parts of the uterus, fallopian tubes and ovaries, and especially in cases of pelvic pain where the underlying cause cannot

be identified using diagnostic imaging methods (sonography and computer tomography). It is used a lot. Laparoscopy will cause much less complications compared to open surgery. For example, adhesion is one of the problems that may arise for a person after open surgery, but in laparoscopy, because the abdomen is not opened, it is not exposed to the air in the environment, and the body tissue is mixed with the equipment used during the operation. No contact, very less stickiness. One of the benefits of laparoscopy is the small scar. Now, to perform this operation, it is necessary to have a camera on the doctor's hand during the surgery so that the doctor can simultaneously observe the patient's abdominal area through the room monitor. In this project, an advanced estimation algorithm is presented to keep the camera holding robot arm active at the same time based on the processing of images from the surgical site without any command based on the end point of the surgical tool. In this algorithm, the target is updated in each iteration to improve the tracking process. This algorithm can track the target correctly, even if its size and shape change.

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