

REVIEW / DERLEME

Post Bariatric Surgery Nursing Care

Bariyatrik Cerrahi Sonrası Hemşirelik Bakımı

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Abstract

Morbid obesity is defined as having a body mass index (BMI) above 40 or having a BMI of 35 and comorbidities along with obesity. Bariatric surgeries can be grouped into three. These are restrictive surgeries, malabsorption (impairing absorption) surgeries, and both restrictive and malabsorption surgeries. In bariatric surgery, restrictive surgeries such as vertical band gastroplasty (VGB), adjustable gastric banding (AGB) surgeries, malabsorption surgeries such as biliopancreatic diversion (BPD)/duodenal switch (DS) surgeries, and both restrictive and malabsorption surgeries such as Roux-en-Y gastric bypass (RYGB) surgeries, are commonly performed. Post-bariatric surgery care should include a multidisciplinary team consisting of a surgeon, an endocrinologist, a psychiatrist, a dietitian, and a nurse specializing in bariatric surgery. Nursing care after obesity surgery is evaluated as early postoperative care (1-3 days) and late postoperative care. Close observation, careful and complete evaluation are important in the specialist nursing care of bariatric surgery patients. In bariatric surgery, patients are provided with routine post-operative nursing care such as oxygen and hemodynamic monitoring, pain management, mobilization, wound care, deep vein thrombosis prophylaxis, early and frequent ambulation, drain care, fluid balance nutrition, training, and emotional support.

Keywords: Obesity, bariatric surgery, nursing care.

Öz

Morbid obezite; beden kitle indeksinin (BKI) 40'ın üzerinde veya BKI 35 olup obeziteye eşlik eden hastalık bulunması olarak tanımlanmaktadır. Obezite ameliyatları üç gruba ayrılmaktadır. Bunlar kısıtlayıcı ameliyatlardır, malabsorbsiyon (emilimi bozan) ameliyatları ve hem kısıtlayıcı hem de malabsorbsiyon ameliyatlardır. Obezite cerrahisinde dikey bant gastroplastisi (VGB), ayarlanabilir mide bandı (AGB) ameliyatları gibi kısıtlayıcı ameliyatlardır, Biliopancreatik Diversiyon (BPD)/duodenal switch (DS) ameliyatları gibi malabsorbsiyon ameliyatları ve Roux-en-Y gastrik bypass (RYGB) ameliyatları gibi hem kısıtlayıcı hem de malabsorbsiyon ameliyatları yaygın olarak yapılmaktadır. Bariyatrik cerrahi ameliyatları sonrası bakım, bir cerrah, bir endokrinolog, bir psikiyatrist, bir diyetisyen ve bir bariyatrik cerrahi tedavisinde uzmanlaşmış bir hemşireden oluşan multidisipliner bir ekibi içermelidir. Obezite cerrahisi sonrası hemşirelik bakımı, ameliyat sonrası erken bakım (1-3 gün) ve ameliyat sonrası geç bakım olarak değerlendirilmektedir. Bariyatrik cerrahi hastalarının uzman hemşirelik bakımında yakından gözlem, dikkatli ve tam değerlendirme önemlidir. Bariyatrik cerrahide hastalara oksijen ve hemodinamik monitarizasyon, ağrı yönetimi, mobilizasyon, yara bakımı, derin ven trombozu profilaksisi, erken ve sık ambulasyon, dren bakımı, sıvı dengesi beslenme, eğitim ve emosyonel destek gibi rutin ameliyat sonrası hemşirelik bakımı yapılır.

Anahtar Kelimeler: Obezite, bariyatrik cerrahi, hemşirelik bakımı.

1. Introduction

According to WHO, "body mass index (BMI) ≥ 25 kg/m² indicates overweight, and BMI ≥ 30 kg/m² indicates obesity in adults"(1). According to Turkey Health Survey: "While the rate of obese individuals aged 15 and over was 19.6% in 2016, it reached 21.1% in 2019. When evaluated in terms of gender: In 2019, 24.8% of women were obese and 30.4% were pre-obese, while 17.3% of men were obese and 39.7% were pre-obese" (2).

Morbid obesity is defined as having a BMI above 40 or having a BMI of 35 and comorbidities along with obesity (3,4). Bariatric surgeries can be grouped into three. These are restrictive surgeries, malabsorption (impairing absorption) surgeries, and both restrictive and malabsorption surgeries (3,5-7). In bariatric surgery, restrictive surgeries such as vertical band gastroplasty (VGB), adjustable gastric banding (AGB) surgeries, malabsorption surgeries such as biliopancreatic diversion (BPD)/duodenal switch (DS)

surgeries, and both restrictive and malabsorption surgeries such as Roux-en-Y gastric bypass (RYGB) surgeries, are commonly performed (5,7,8).

Post-surgery care should include a multidisciplinary team consisting of a surgeon, an endocrinologist, a psychiatrist, a dietitian, and a nurse specializing in bariatric surgery. Complete blood count, electrolyte level, evaluation of kidney and liver function should be monitored every 12 hours for the next 48 hours and daily for the next 3 days (9).

1.1. Post-Bariatric Surgery Care

1.1.1. Obesity Surgery Early Postoperative Period: (1-3) Days

Patients undergoing bariatric surgery are admitted to the post-anesthetic care unit (PACU) immediately after surgery. Generally, on the 1st postoperative day (POD), after the gastrograf leak test, if there is a nasogastric tube, oral

treatment is initiated in tablet or crushed tablet and liquid form (10). Nothing is given by mouth in the postoperative diet until upper gastrointestinal reactions (swallow test) are performed. This test is usually performed the day after surgery. Patients are usually started on 30 ml liquids 6-10 times a day and continued with a protein-containing liquid diet (3,8). Tests such as electrolytes, kidney function, complete blood count, liver function, partial thromboplastin time, and prothrombin time should be performed every 12 hours for two consecutive postoperative days, then every 24 hours for the next 3 days (10).

Oral support and/or enteral product support can be provided to the patient in the early postoperative period to prevent possible malnutrition risk and nutritional deficiencies. Adequate fluid intake is very important to prevent further complications that may occur due to dehydration and the limitation of stomach size after surgery (1).

1.1.2. Obesity Surgery Postoperative Late Period

After the PACU period, most patients are transferred to the postoperative surgical unit. For the next 24-72 hours, postoperative care priorities include assessment of anastomotic leak (10).

Close observation, careful and complete evaluation are important in the specialist nursing care of bariatric surgery patients. In bariatric surgery, routine postoperative nursing care such as oxygen support and hemodynamic monitoring, pain management, mobilization, wound care, deep vein thrombosis prophylaxis, drain care, fluid balance, nutrition, early and frequent ambulation, training and emotional support are provided to patients (6,8,10,11). Post-bariatric nausea and vomiting are directly related to the duration of the surgery, and the incidence of nausea and vomiting is also increased in women, non-smokers, and patients with a history of vomiting or motion sickness. Before the development of postoperative nausea and vomiting, pharmacological prophylaxis significantly reduces the incidence of postoperative nausea and vomiting (10). Excessive intra-abdominal pressure can strain the incision lines. Therefore, it is important to treat nausea and prevent vomiting in the postoperative period. Abdominal support provided by an abdominal binder helps to protect the surgical suture area (11).

After the re-emergence of bowel sounds, the patient can eat, a total of 600-800 calorie intake should be provided in six small meals a day and fluid intake should be supported to prevent dehydration. The patient's diet should start with clear liquids and continue toward solid nutrition (12).

1.1.3. Oxygen and Hemodynamic Monitoring

Deep breathing, coughing, and turning are important nursing interventions to maintain lung functions in postoperative surgical patients. Because of obesity-related changes in pulmonary function, functional residual capacity is reduced in obese patients. They have little reserve capacity when faced with respiratory distress. Continuous pulse oximetry and cardiac monitoring are used for the first 24-48 hours after surgery, as administration of anesthetic agents and narcotic drugs may contribute to respiratory depression. Auscultation of respiratory sounds is best accomplished by leaning the patient forward or positioning

in the reverse Trendelenburg position while sitting next to the bed. Side-sleeping option is best tolerated if the head side of the bed is elevated to 30-45 degrees (11).

Oxygen is given by nasal cannula. Respiratory problems are a common complication seen in the early postoperative period after bariatric surgery. Patients with significant comorbidities, particularly pulmonary, neuromuscular, or cardiac problems, are at higher risk of respiratory distress, but any patient may develop hypoxemia following bariatric surgery (10,13).

1.1.4. Pain Management

The level of pain should be evaluated using a regular standard numerical pain scale and it should be ensured that the pain is under control. The patient should be encouraged for early ambulation to reduce the risk of complications related to immobility. If there is no pain, patients can turn around on their own, sit in a chair, and walk within 8 hours after surgery (8,12). Adequate pain management improves patient mobility and reduces pulmonary complications. When pain is managed, patients can use spirometry, coughing, and deep breathing more willingly every hour. In the first 24-48 hours, patient-controlled analgesia (PCA) is often used to provide pain management (8,11).

1.1.5. Wound and Skin Care

During the recovery period, the vital signs of patients should be monitored routinely, evaluated about complications, and skin and wound care should be provided. Patient's tubes and catheters should be evaluated every 2 hours. Patients should be supported to do the breathing and leg exercises taught before surgery. The head of the bed should be adjusted to the 30-degree semi-fowler position to assist breathing by reducing the weight of abdominal fatty tissue pressuring on the diaphragm (8,12).

Less mobile patients will need assistance while turning and repositioning. An overweight patient is prone to skin deterioration due to the pressure created by surgical drainage and foley-catheter tubes placed on the skin or skin folds. The skin should be kept clean and dry. The risk can be reduced by placing absorbent fabric, gauze, or silver-impregnated textile products on the folds to prevent fungal infections on the skin folds on the breasts and/or back, thighs, abdomen, and perineum (3). The use of powders or talc/powders should be avoided as they tend to agglomerate and contribute to irritation. Plastic undercoated bottom pads create excessive heat and perspiration, using a cloth pad or a specially formulated backing to wick away moisture helps protect the skin. Since the epidermal layer is thinly stretched and sensitive to skin ruptures, medical dressings, and tapes should be carefully applied to the skin. In case of a complicated wound, it is recommended to consult a wound care nurse specialist or if there is no in the institution, it is recommended to consult a relevant specialist (11).

1.1.6. Venous Thromboembolism (VTE) Prophylaxis

Pharmacological methods containing subcutaneous unfractionated or low molecular weight heparin and pneumatic compression devices can be used for venous thromboembolism prophylaxis (13). It is recommended to apply compression devices in the operating room before

the administration of anesthetic agents. Administration of unfractionated or low molecular weight heparin preparations, early postoperative mobilization, and frequent ambulation form the triad which is considered as "VTE prophylaxis". Preoperative placement of a filter on the inferior vena cava should be considered if the patient has a history of, endothelial damage, venous stasis, hypercoagulation and/or a prior VTE or pulmonary embolism. Vena cava filters (IVC) prevent embolism migration from the lower extremities to the heart, lungs, or brain (11).

Close monitoring of deep vein thrombosis (DVT) signs and symptoms is important. Pneumatic compression devices should be discontinued when the patient moves or used only when the patient is in bed. Homans' sign, which is used to define DVT, should be checked, and preparation for further examination should be made when unilateral swelling, redness, pain, and a change in pulse rate are detected. In case of any swelling, pain, or redness of the extremities, the physician should be informed immediately. The patient should be monitored for signs of bleeding, which is an adverse effect of heparin therapy (14).

Ultrasound evaluation is recommended for all patients for DVT prophylaxis after bariatric surgery, D-dimer test should be performed on patients with suspected DVT, especially after a long operation time, repeated ultrasound or venography may be required (10). A stable patient should be encouraged to sit up and swing their legs next to the bed immediately after surgery. If this is well tolerated, activity can progress gradually to getting out of bed slowly at least three to four times a day, starting at the end of the first postoperative day (11).

1.1.7. Psychosocial and Emotional Support

Unhurried approaching the patient, making eye contact, therapeutic touch, and positive reinforcement of small achievements help create a positive outcome for both patients and staff. Studies have shown that more than 50% of bariatric surgery patients have a concurrent diagnosis of psychological disorder, anxiety, or depression. In these patients, antidepressants, anxiolytics and/or antipsychotic medications must be resumed as soon as possible after the surgery to avoid adverse effects of withdrawal. For these patients, it is recommended that a treatment plan be developed to address these concerns before surgery (11).

1.1.8. Diet After Bariatric Surgery

Within a few weeks after bariatric surgery, patients switch from a liquid diet to a soft diet, and then to a solid diet. In the long term, patients are encouraged to follow a structured post-bariatric surgery diet that includes small portions, a balanced and structured meal, and healthy snacks (chew foods slowly and avoid sweets). Patients should not drink beverages at the same time as meals (avoid liquids within 30 minutes after eating solids). Carbonated and caffeinated beverages should be avoided as they can increase the risk of ulcers. After bariatric surgery, patients should follow a low-fat, moderate-carbohydrate, and high-protein diet (15).

1.2. Complications After Bariatric Surgery

1.2.1. Anastomotic Leak

Anastomotic leaks are the most serious complication after bariatric surgery and one of the most common causes of death. It is difficult to diagnose as its clinical signs are not easily perceived. Patients with anastomotic leakage may experience gradually increasing back or left shoulder pain, abdominal pain, substernal pressure and pelvic pain (3). In addition, there are symptoms such as hiccups, restlessness, dyspnea, unexplained tachycardia, high fever, convulsions, and hypotension (6,8,16).

Tachycardia (beats > 120 per minute) may be the first and most important sign of leakage, accompanied by shortness of breath, abdominal pain, and fever the average time for symptoms to appear is approximately 3 days after the operation. Postoperative patients presenting with tachycardia and hypotension should be appropriately resuscitated and evaluated about myocardial infarction and pulmonary embolism (PE). The most sensitive test in diagnosis is the C-reactive protein (CRP) level (11).

Another symptom is a decrease in urine output and an increase in urea and nitrogen in the blood. If anastomotic leakage is not noticed, it can result in multiple organ failure, sepsis, and even death (8,17).

If the nurse detects significant hardness in the patient's abdomen, decreased hemogram, high-level potassium, non-incisional abdominal pain, or if laboratory results indicate metabolic acidosis, the nurse should suspect and report anastomotic leak, internal bleeding, abdominal compartment syndrome, or sepsis (6,12,14). Frequent monitoring of blood pressure and heart rate is important in the early postoperative period because changes may alert the nurse for complications such as anastomotic leakage and hemorrhage. A sudden increase in heart rate is one of the important signs of anastomotic leak and hemorrhage (8,14).

1.2.2. Wound Infection

Obese patients are at risk of wound complications such as dehiscence, infection, and slow healing. Wound infection/sepsis is the most common early postoperative complication. Poor blood flow to the adipose tissue, increased wound stretch, high intra-abdominal pressure, frequent diabetes mellitus, excessive moisture, bacterial accumulation around the wound, and wound opening are among the factors contributing to infection (3,8,11).

Symptoms of wound infection may be fever, pain, skin redness, and inflammation in the surgical area. Wound infection can occur in obese surgical patients within three weeks of surgery. Early infections also bring along a high risk of incisional hernia (16). Important elements in the treatment of wound infection are regular care, drainage, and broad-spectrum antibiotics (8,17).

1.2.3. Immobility

Morbidly obese patients, compared to other people, have a greater risk of inactivity-related complications. Immobility after surgery can cause pulmonary embolism (PE), deep vein thrombosis (DVT), respiratory failure, and skin deterioration (3).

The patient should be ambulated within 2-24 hours after surgery. Movements out of bed should be increased as tolerated three times a day and walking aids should be used (8,14).

In an obese patient, additional evaluation, intervention, and follow-up are required. Functional residual capacity is decreased in obese patients due to obesity-related changes in pulmonary function. On the other hand, the management of anesthetic and narcotic drugs used during surgery may cause respiratory depression. Therefore, the patient's respiratory function should be evaluated regularly. Patient respiration should be monitored with objective findings such as oxygen saturation and heart rhythm monitoring, auscultation of respiratory sounds, monitoring the rate and depth of respiration, and use of auxiliary respiratory muscles. Complications can be minimized by careful monitoring and evaluation of minor changes (3,11).

Hypoventilation syndrome and obstructive sleep apnea are common problems in obese individuals. Reductions in lung and chest wall expansion due to excess weight result in the accumulation of carbon dioxide in the blood ($\text{PaCO}_2 > 45 \text{ mm Hg}$). Patients often feel sleepy or fall asleep and experience periods of apnea, consequently, hypoxia develops. Other intraoperative and postoperative drugs and anesthetics, can also exacerbate this situation (3,8).

Atelectasis is common in the postoperative period. Fever and tachycardia are seen in the first 24 hours along with atelectasis. Treatment includes the use of spirometry, and continuous positive air pressure (CPAP) (18).

Pulmonary embolism is the second most common cause of death in bariatric surgery patients, the rate of incidence is 2% (11). Effective prophylactic treatment for DVT/PE, low molecular weight heparin should be given preoperatively and postoperatively until discharge, the use of pressure devices and anti-embolism stockings should be continued postoperatively (8,14).

1.2.4. Dumping Syndrome

Dumping syndrome (DS) is a health problem characterized by vasomotor and gastrointestinal symptoms due to rapid gastric emptying or rapid exposure of the small intestine to nutrients. In dumping syndrome, symptoms are typically triggered by eating and manifest as "early" and "late" dumping symptoms (1) (Table 1).

Table 1. Postoperative Nursing Care

Oxygen and hemodynamic monitoring	Pain management
Mobilization	Wound care
Fluid balance and nutrition	Drain care
Training	Early and frequent ambulation
Emotional support	Deep vein thrombosis prophylaxis

Dumping syndrome can occur during hospitalization or after discharge and is usually seen in patients who had a mixed bariatric surgery known as gastric bypass, duodenal switch, or biliopancreatic diversion (14).

Vomiting and diarrhea are seen in half of the patients undergoing restrictive administration. These problems may be short-lived, as patients will adapt to their new anatomy

after a while. Postprandial diarrhea is more commonly observed as dumping syndrome (3).

Dumping syndrome occurs in all patients, usually for at least 6 months after surgery, because the pyloric sphincter is bypassed and food passes quickly into the small intestine. As a result, a large amount of water is drawn into the small intestine, which allows food to be quickly pushed into the digestive tract. As a result of the increase in peristalsis, patients can experience palpitations, sweating, weakness, dizziness, diarrhea, nausea, fatigue, and abdominal cramps. A second factor that causes dumping syndrome is the consumption of sugary foods (such as cookies, cake, candy, and non-diet soft drinks) (14).

Early dumping syndrome occurs within the first hour after a meal. Early dumping symptoms occur in response to the rapid passage of hyperosmolar nutrients into the small intestine, and they increase the release of gastrointestinal hormones that may accompany the shift of fluids from the intravascular compartment into the lumen (1,15).

Early dumping is characterized by gastrointestinal symptoms such as abdominal pain, flatulence, diarrhea, and nausea, and vasomotor symptoms such as fatigue, flushing, desire to lie down after meals sweating, tachycardia, hypotension (rarely syncope). Late dumping usually occurs one to three hours after a meal and is a result of an incretin-mediated hyperinsulinemic response after carbohydrate ingestion. Symptoms due to hypoglycemia are associated with neuroglycopenia and autonomic/adrenergic reactivity (15).

Dumping syndrome loses its effect approximately 12-18 months after surgery. BPD/DS patients may experience problems such as excessive and foul-smelling stool (steatorrhea), flatulence, bad body odor, and bloating syndrome. Precautions to be taken to prevent dumping syndrome: avoiding foods with high artificial and natural sugar levels, eating small meals frequently, eating and drinking slowly, chewing food completely, drinking fluids between and before meals, not taking fluids with meals, and sitting in a lying position 30 minutes after meals (3).

Table 2. Types of Dumping Symptoms

Early Dumping	Late Dumping
Gastrointestinal symptoms:	Hypoglycemia:
Abdominal pain, diarrhea, stomach noises, bloating, vomiting	Sweating, palpitations, confusion, tremor
Vasomotor symptoms:	
Palpitations, sweating, hypotension, tachycardia, flushing, fainting	

1.2.5. Rhabdomyolysis

Although rhabdomyolysis is a rare event, it is considered an early complication about bariatric surgery. It is caused by skeletal muscle necrosis due to prolonged muscle compression and ischemia (3,11).

The primary diagnostic indicator is elevated serum creatine phosphokinase (CPK) levels. An elevation of five times the normal level ($> 1000 \text{ I/U}$) is indicative of rhabdomyolysis. If rhabdomyolysis is suspected, the serum creatine kinase level should be measured. In patients with type 2 diabetes, serum glucose levels should be monitored in the postoperative period and hypoglycemia should be avoided in these

patients.[13] There may be complaints such as hip, shoulder, or hip discomfort with numbness, bruising, swelling, and/or weakness (11).

Among the risk factors are the duration of the operation, the position of the patient during the operation, and obesity. Numbness or muscle pain in the hip, back, and shoulder region is a sign of rhabdomyolysis. As can be seen in dark urine, myoglobinuria may occur. An increase in serum level of keratin kinase exceeding 5000 U/L, 48-72 hours after surgery, is a sign of rhabdomyolysis. In this case, early diagnosis can prevent the complication from progressing further and leading to conditions such as oliguric acute kidney failure.[3]For the prevention of rhabdomyolysis and related complications: preoperative and postoperative lying position of the patient, applying a pillow to the gluteal region and other pressure areas, keeping the operation time short, and fluid replacement applied to maintain intravascular volume (3,19).

2. Conclusion and Recommendations

As a result, the nurse's role in the team is very important in preventing complications after bariatric surgery and providing appropriate treatment and care when complications develop. The nurse should be vigilant for the complications that may develop and should be meticulous in postoperative care to prevent them from developing (8) (Table 2).

3. Contribution to the Field

This review aims to be a resource for nursing care after bariatric surgery and provide effective nursing care against complications that may develop. It is thought that it will raise awareness of the importance of nursing care in this field.

Conflict of Interest

There is no conflict of interest regarding any person and/or institution.

Authorship Contribution

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References

1. T. C. Sağlık Bakanlığı Sağlık Hizmetleri Genel Müdürlüğü. Obezite ve Metabolik Cerrahi Klinik Protokolü. Ankara; 2021. Available from: <https://dosyamerkez.saglik.gov.tr/Eklenti/41294/0/obezitekllinikprotokolu13082021.pdf>
2. data.tuik.gov.tr [Internet]. Türkiye Sağlık Araştırması; 2019 [cited 2022 Jan 15]. Available from: <https://data.tuik.gov.tr/Bulten/Index?p=Turkey-Health-Survey-2019-33661>
3. Barth MM, Jenson CE. Postoperative nursing care of gastric bypass patients. *Am J Crit Care.* 2006 Jul;15(4):378-87.
4. Chebli JE. The current state of obesity, metabolism, and bariatric surgery. *Bariatric Nursing and Surgical Patient Care.* 2009;4(4):295-7.
5. Association of periOperative Registered Nurses. AORN Bariatric Surgery Guideline. *AORN J.* 2004;75(5):1026-52.
6. Harrington L. Postoperative care of patients undergoing bariatric surgery. *Medsurg Nurs.* 2006;15(6):357-63.

7. Ide P, Farber E, Lautz D. Perioperative nursing care of the bariatric surgical patient. *AORN J.* 2008 Jul;88(1):30-54.
8. Aygin D, Açıl H. Early stage nursing care in morbid obesity after bariatric surgery, Gümüşhane University Journal of Health Sciences. 2015;4(4):604-13.
9. Mulligan AT, McNamara AM, Boulton HW, Trainor LS, Raiano C, Mullen A. Best practice updates for nursing care in weight loss surgery. *Obesity.* 2009;17(5):895-900.
10. Elrazek AEMA, Elbanna AEM, Bilasy SE. Medical management of patients after bariatric surgery: Principles and guidelines. *World J Gastrointest Surg.* 2014 Nov;6(11):220-8.
11. Kaser NJ, Kukla A. Weight-Loss Surgery. *Online J Issues Nurs.* 2009;14(1):4.
12. Gallagher S. Taking the weight off with bariatric surgery. *Nursing.* 2004;34(3):58-63.
13. Sabuncu T, Kiyici S, Eren MA, Sancak S, Sönmez A, Güldiken S, et al. Summary of Bariatric Surgery Guideline of the Society of Endocrinology and Metabolism of Turkey. *Turk J Endocrinol Metab.* 2017;21:140-7.
14. Grindel ME, Grindel CG. Nursing care of the person having bariatric surgery. *Medsurg Nurs.* 2006;15(3):129-45.
15. Canadian adult obesity clinical practice guidelines: bariatric surgery: Postoperative Management. 2020;1-15. Available from: http://www.ihsm.gov.tr/indir/mevzuat/genelgeler/G_13082007_1.pdf
16. Virji A, Murr MM. Caring for patients after bariatric surgery. *Am Fam Physician.* 2006 Apr 15;73(8):1403-8.
17. Mechanick JI, Kushner RF, Sugerma HJ, Gonzalez-Campoy JM, Collazo-Clavell ML, Spitz AF, et al. American Association of Clinical Endocrinologists, The Obesity Society, and American Society for Metabolic & Bariatric Surgery Medical Guidelines for Clinical Practice for the Perioperative Nutritional, Metabolic, and Nonsurgical Support of the Bariatric Surgery Patient. *Obesity (Silver Spring).* 2008;4(5):109-84.
18. Levi D, Goodman E, Patel M, Savransky Y. Critical care of the obese and bariatric surgical patient. *Crit Care Clin.* 2003;19(1):11-32.
19. Pieracci FM, Barie PS, Pomp A. Critical care of the bariatric patient. *Crit Care Med.* 2006;34(6):1796-804.