

# Anesthetic Management Of A Morbidly Obese Patient With Supracondylar Femur Fracture

Suprakondiler Femur Kırığı İle Birlikte Olan Morbid Obez Hastada Anestezi Yönetimi

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## Abstract

To our literature search, supracondylar femur fracture is not a rare circumstance with morbid obesity. We report a case of closed reduction and internal fixation for a supracondylar femur fracture of a 46-year-old, 168 kg, 172 cm tall [body mass index (BMI) > 55 kg/m<sup>2</sup>] morbid obese man. The patient was premedicated with diazepam 10 mg orally and was brought to the operating room on a transport stretcher and taken onto conventional operating tables hardly that had been placed side by side. Since the morbidly obese patient has such risk factors as hypertension and Mallampati Score IV and type II diabetes and obstructive sleep apnea (OSA), standard dose spinal anesthesia, including hyperbaric bupivacaine and fentanyl mixture, was decided to be given. As the consequences of proper attention to special status such as easy positioning, suitable anesthesia technique, avoiding complications about airway and haemodynamics, he safely underwent to the closed reduction with single dose spinal anesthesia.

**Key Words:** Supracondylar femur fracture, Morbid obesity, Spinal anesthesia, Body mass index.

## Özet

Literatür araştırmalarımıza göre suprakondiler femur kırığı, morbid obesite ile birlikte nadir görülen bir durum değildir. Biz 46 yaşında, 168 kilo, 172 cm [vücut kitle indeksi (BMI) > 55 kg/ m<sup>2</sup>] suprakondiler femur kırığı nedeni ile internal fiksasyon ve kapalı redüksiyon uygulanacak olan morbid obez bir erkek hastayı sunduk. Hasta 10 mg oral diazepam ile premedike edildi ve hastaneye bir sedye ile getirildi ve yan yana getirilmiş iki standart ameliyat masası üzerine zorlukla alındı. Morbid obez hastada hipertansiyon, mallampati skor IV, tip II diyabet, obstrüktif uyku apnesi (OSA) gibi risk faktörleri olduğu için hiperbarik bupivakain ile fentanil içeren karışım verilmek üzere spinal anestezi planlandı. Kolay pozisyon verme, uygun anestezi tekniği, hava yolu ve hemodinami ile ilgili komplikasyonlardan kaçınma gibi özel durumlar için uygun kararın verilmesi sonucunda hastaya tek doz spinal anestezi eşliğinde güvenle kapalı redüksiyon uygulandı.

**Anahtar kelimeler:** Suprakondiler femur kırığı, Morbid obesite, Spinal anestezi, Vücut kitle indeksi.

## Introduction

More than one-third of American adults are obese and nearly 5% are severely or morbid obese. The difficulties faced by hospital services in dealing with very obese patients are not well documented in medical literature. The very obese patient expend many emergency department resources contain specialized equipment, preparedness and information (1). In recent years, we have seen a significant increase in the number of morbidly obese patients in our institution. One of them is the morbidly obese patient with supracondylar femur fracture. These kinds of cases are not uncommon and spinal anesthesia is mostly accepted for surgery involving the lower extremities (2). With increase of the obese population, many kinds of injuries will be seen more frequently (3).

We describe a morbidly obese patient with supracondylar femur fracture in whom a total intrathecal dose of bupivacaine 20 mg and fentanyl 20 µg was sufficient and confident for closed reduction and internal fixation without the need of any other intravenous supplements and without any important complication. In general determining the appropriate medical intervention, for example ICU admission, mechanical ventilation, anesthesia and surgery can be less clear-cut for the non obese (1).

## Case Report

A 46-year-old, morbid obese man (Figure 1), was admitted with the diagnosis of supracondylar femur fracture. His body weight was 168 kg, he was 172 cm tall [body mass index (BMI) > 55 kg /m<sup>2</sup>]. He had a significant history of diabetes mellitus type II and poorly controlled hypertension.

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He also had OSA symptoms. His blood pressure on admission was 190/100 mmHg, heart rate was 85 beat/min, SPO2 was 95%, respiration rate was 19 res/min and he had a Mallampati Class IV airway, a thyromental distance less than three fingers, a very short neck. He complained of shortness of breath comfortably but his lungs were clear according to the lung graphy and auscultation.

Blood glucose was 178 g/dl, other vital signs, laboratory data and ECG were each within normal limits. After premedication with diazepam 10 mg orally, the patient was taken to the operating room on a transport stretcher. A radial artery catheter of 20 Gauge was placed on the right and a venous catheter of 18 Gauge was placed on the dorsum of the left hand. Both processes were difficult and the patient was allowed to breath 100 % O2 via facemask. Nine people were needed to place the patient onto two conventional operating tables that had been placed side by side. He was treated with labetalol and orally antidiabetic drug so as to maintain the blood pressure and blood glucose stable. 1000 ml bolus and subsequent continuous maintenance infusion of ringer lactate solution was applied. His blood pressure after the bolus of ringer lactate and before the spinal anesthetic plan was 180/90 mmHg. He was mildly sedated with midazolam (2 mg). Spinal anesthesia was performed in the sitting position according to our frequent using a 22-G pencil point needle. After identifying the subarachnoid space approximately at the L3-L4 level, we administered hyperbaric 0.5% bupivacaine 20 mg and 20µg fentanyl mixture. After the spinal dose, the blood pressure dropped to 110/ 90 mm Hg and he complained of nausea. 20 mg of ephedrine was administered to restore the systolic blood pressure. Fifteen minutes after the onset of the spinal anesthesia the sensory blockade was assessed to be at T8 and pinprick was T6 level bilaterally.

The total surgical time from skin incision to dressing was 95 min. He remained hemodynamically stable throughout the operation. The surgery was completed successfully without any supplemental intravenous agents. He received intramuscularly meperidine 75 mg every 8 h for postoperative pain control in the postoperative care unit and was discharged from the hospital after 3 days.

### Discussion

The calculated BMI is divided into different category with > 25 considered overweight, > 30 considered obese and > 40 considered morbidly obese. It's easily applied and widely used pragmatic measure (1). Health services are meeting a global augmentation in obesity with an estimated 1.1 billion overweight people world wide of whom 250 million are classified as obese (4,5). Obesity is associated with diseases of many organ systems. Cardiovascular consequences such as systemic and pulmonary hypertension, atherosclerosis, congestive heart failure, coronary artery disease and sudden death are well investigated and clarified (6,7).

Prehospital and interhospital transport of morbidly obese people should be taken into consideration. Standard NSW ambulance stretchers have load ratings ranging up to 220 kg and instability in the raised position may make transportation impossible for these patients. It is advised that emergency departments should have special protocols for morbidly obese patients for obtaining appropriate beds and lifting equipment in the short run (1).



**Figure 1.** Morbid obese man and operating tables were placed side by side.

Some special management strategies must also be considered for morbidly obese patients. An operating room with sufficient space is required and we had to choose a larger operating room. Two tables could be placed side-by-side to accommodate a very large sized or heavy patient. Standard monitoring such as pulse oxymeter, electrocardiogram and non-invasive blood pressure measurements may have decreased utility in morbid obesity because of increased soft tissue thickness. Thus we performed invasive blood pressure monitoring. Airway difficulty should be anticipated in all such patients (8, 9).

Several studies have demonstrated an association between difficult intubation and increasing BMI (10,11). The optimal approach to intubation of the morbidly obese patients is unclear. The morbidly obese patients will have reduced lung and chest wall compliance, as well as deranged physiological parameters, which have been shown to worsen during anesthesia and ventilation (12).

Obesity is associated with high intraabdominal pressure and decreased functional residual capacity, end-expiratory lung volume, and total lung capacity. And also the risk of postoperative tromboembolism, atelectasis and pneumonia are believed to be more in morbidly obese patients.

During general anesthesia with muscle paralysis, there is a further reduction of lung volume, which is directly related to increasing BMI (13,14). Morbidly obese patients pose an anesthetic challenge for neuraxial anesthesia. We chose spinal anesthesia for our patient because of Mallampati Score IV, shortness of the thyromental distance and very short neck. Actually, neuraxial blockade is made difficult because anatomical landmarks are disappeared by redundant soft tissue and they often have co-morbid sickness as hypertension and diabetes (15). Spinal anesthesia was performed with difficulty. Our morbidly obese patient had a high sensory block after 20 mg of bupivacaine and 20µg fentanyl mixture. After the successful manipulation, the surgical incision was started without any complaint of the patient. We didn't know if this operation could have been completed successfully with 20 mg of bupivacaine and 20µg fentanyl given the amount of surgical manipulation required. Few studies directly assess the safe and effective spinal dose in morbidly obese patients. Single-shot spinal anesthesia with an appropriate dose, epidural anesthesia has all been used successfully for morbidly obese patients. The addition of an opioid with a lower local anesthetic dose may decrease hypotension (16). Ben-David et al. searched the use of opioid in low dose spinal anesthesia and concluded that a lower local anesthetic dose combined with opioid provided adequate anesthesia and decreased incidence of hypotension by 30% (17). So we decided low dose spinal opioid use in this morbidly obese patient as he had a history of obstructive sleep apnea.

Moreover, Vercauteren et al. investigated that intrathecally administered hyperbaric bupivacaine offers a lower incidence of hypotension and nausea and a more reliable cephalad spread of spinal block than glucose-free isobaric bupivacaine (17). Emet at all. experienced in morbidly obese patients that standard dose spinal anesthesia is safe and effective; a dose reduction is not necessary (18). Bariatric surgery has been developing and has been used nowadays for the treatment of the morbidly obese patients (19). Recent studies show that there is a substantial reduction of mortality in bariatric surgery patients (20).

### Conclusion

The physicians should be aware of the limitations of physical examination of the morbid obese patient and prefer the most suitable anesthesia technique. This case report reviews anesthetic considerations of a morbidly obese patient with supracondylar femur fracture and explains a strategy for the anesthetic safety.

As the consequences of proper attention to special status such as easy positioning, suitable anesthesia technique, avoiding complications about airway and haemodynamics, he safely underwent to the closed reduction with single dose spinal anesthesia. The other procedures such as prehospital and interhospital transport, some special management strategies should be considered and performed at inter disciplinary obesity management centers with appropriately trained staff and adequate equipment.

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