**Case Report**

**Successful management of anesthesia in a cesarean section of a woman with morbid obesity: A case report**

**Running title: Anesthesia in cesarean section of a morbid obesity woman**

Farnoush Farzi, Sodabeh Kazemi, Ziba Zahiri Sorouri, Samaneh Ghazanfar Tehran, Mahin Tayefeh Ashrafiyeh, Mandana Javanak, Mohammad Shahbazi

1- Farnoush Farzi MD, (Associate Professor of Anesthesiology). Anesthesiology Research Center, Department of Anesthesiology, Alzahra hospital, Guilan University of Medical Sciences, Rasht, Iran.Email:farnoushfarzi1374@gmail.com/Phone number: +989113311653 / orcid: <http://orcid.org/0000-0001-8850-7735>

2- Sodabeh Kazemi MD, Assistant Professor of Genicology, Reproductive Health Research Center, Department of Obstetrics and Gynecology, Al-Zahra Hospital, School of Medicine, Guilan University of Medical Sciences, Rasht, Iran./ Email:drsodabehkazemi@gmail.com/ Phone number: 09113423427 / orcid: <https://orcid.org/0000-0002-3953-2018>

3**-** Ziba Zahiri Sorouri MD, Professor of Infertility & IVF, Reproductive Health Research Center, Department of Obstetrics and Gynecology, Al-Zahra Hospital, School of Medicine, Guilan University of Medical Sciences, Rasht, Iran/phone number:+989121055292/ Email:drzibazahari@gums.ac.ir/https://orcid.org/0000-0001-5746-4269

🞺4- Samaneh Ghazanfar Tehran MD, Assistant Professor of Anesthesiology. Anesthesiology Research Center, Department of Anesthesiology, Alzahra hospital, Guilan University of Medical Sciences, Rasht, Iran./Tel:09112318819/ Email: Tehranisamaneh88rasht@gmail.com/orcid:0000-0002-9910-2394

5- Mahin Tayefeh Ashrafiyeh, (MSc in Drug Quality Assurance). Anesthesiology Research Center, Department of Anesthesiology, Alzahra hospital, Guilan University of Medical Sciences, Rasht, Iran/ Email:mahintayefe@gmail.com/Tel: +989111405147/ <https://orcid.org/0000-0002-0706-6681>

6- Mandana Javanak, PHD of Educational Management. Education Development Center, Guilan University of Medical Sciences, Rasht, Iran/Tel:+989111388548/ Email: mandanajavanak@yahoo.com/ Orcid: 0000-0003-1447-3397

7- Mohammad Shahbazi MD,Resident of Anesthesiology, Anesthesiology Research Center, Department of Anesthesiology, Alzahra hospital, Guilan University of Medical Sciences, Rasht, Iran/ Phone number: +989111831406/ Email: shahbazimohammad59@gmail.com

**Corresponding author:** Samaneh Ghazanfar Tehran MD,

Mailing address: P.O.Box: 4144654839, Anesthesiology Research Center , Al-zahra Hospital, Guilan University of Medical Sciences, Namjoo Street, Rasht, Iran

**Tel:** 09112318819 **orcid:** 0000-0002-9910-2394 **Email:** Tehranisamaneh88rasht@gmail.com

**Abstract**

 Having body mass index more than 29 is described as obesity in pregnancy. Anesthesia management in these patients has always been challenging. A 41-year-old woman, at 37weeks’ gestation with the weight of 200kg and body mass index of 66/05 was admitted with complaint of pain to Al-Zahra Hospital in Rasht. She reported a history of two previous caesarean sections and high blood sugar and hypothyroidism which were under control by drugs. The Anesthesiology team decided to choose Continuous Spinal Anesthesia method for her. After performing anesthesia, cesarean delivery was done and a female neonate was born with Apgar score of 5-9. They were discharged from the hospital in good condition after two days.Based on the results of this study, CSA approach is a suitable method for anesthesia management in cesarean section of obese patients. Also it is necessary to recommend these patients to refer to anesthesia counseling clinics before giving birth.

***Key words:*** *Cesarean section, Continuous Spinal Anesthesia, Excessive Obesity, Body Mass Index*

**Introduction:**

Obesity refers to a body mass index (BMI) greater than 30. The World Health Organization (WHO) reported that 650 million adults worldwide have a BMI> 30 kg / m2 and are therefore classified as obese (1). Only in America, about 65 million women are overweight. Recent studies have reported obesity in Iran as well Europe and the United States (2). Obesity is divided into three categories: Class I: BMI 30 to 34.9, Class II: BMI range 35 to 39.9 and Class III: BMI more than 40. The last category is also called extreme obesity or morbid obesity. In some cases, BMI greater than 50 is also called Super-obesity (3). During pregnancy, obesity is described as a BMI greater than 29 (2). Obesity is a risk factor for many health conditions such as ischemic heart disease and Respiratory problems (1).

Obesity during pregnancy is associated with gestational diabetes, hypertension, preeclampsia, Intra-uterine growth restriction (**IUGR**), and thromboembolic events. Obesity can increase risk of Preterm Labor and many problems at the onset of labor pains, and also the need for cesarean section and long staying at the hospital (2, 4).

Infants born to obese women are more likely to be overweight at birth and are more prone to obesity in adulthood (4). Complications of anesthesia and maternal mortality increase among these patients (5). According to the Confidential Enquiry into Maternal and Child Health (CEMACH), 30% of maternal deaths between 2000 and 2002 involved obese women (4). Since pregnancy with extreme obesity is one of the rarest cases in the country, and also the importance of anesthesia management in maternal and neonatal health, this case report introduces the successful management of a cesarean section for a diabetic obese patient with continuous spinal anesthesia.

**Case Report:**

A 41-year-old woman with 200 kg weight, 174cm height, and BMI 66.05$kg/m^{2}$, gravid 3 and at 37weeks’ gestation was referred to Al-Zahra educational medical center. She lost one of her children at the age of two due to cold. The patient's gestational age was matched to early pregnancy ultrasounds based on the date of the last menstrual period. She complained of pain and also had functional dyspnea upon arrival. Her medical history includes 2 cesarean sections and tonsillectomy.

The patient also reported a history of varicose veins of the lower limbs, high blood sugar and hypothyroidism during this pregnancy which was under treatment by using insulin and levothyroxine. Due to two previous cesarean sections, she was candidate for another cesarean section, two days after hospitalization. Anesthesia team selected a continuous spinal anesthesia method for her.

Two Peripheral vein lines *gauge* 16, were implanted. Standard monitoring of vital signs was established and a sphygmomanometer with appropriate size was selected for her. She's vital signs the beginning of operation were normal: blood pressure of 130/78 mm Hg, heart rate of 86 beats/min. The patient was placed in a sitting position with the help of team members. Due to the narrowness of the bed, a stretcher was placed next to the patient's bed in a completely fixed position. In order to go full aseptic precaution, three steps of washing the patient's back with standard Betadine solution were performed. The patient's intervertebral spaces were not easily identifiable. For local anesthesia of injection site, 2% injectable lidocaine was used. For CSA a 17 G Touhy epidural needle was inserted into L3-L4 space. The entire length of the 9.8 cm needle was used to reach the subarachnoid space.

A 19 cm catheter was threaded into the subarachnoid space up to a distance of 3 cm, and by CSF aspiration the presence of the catheter in the subarachnoid space was confirmed. The catheter was fixed in its place, and then carefully she was placed in supine position and completely in middle of the bed to equalize the weight distribution. For easier breathing, bed was raised 15-20 degrees upright. Till getting to the level of T6 (A level in anesthesia which is suitable for cesarean section) doses of 2 cc and 1 cc of bupivacaine 0.5% were injected gradually through the catheter. Due to the long surgical time, when the anesthetic level was lowered, in two stages 1 cc of bupivacaine 0.5% was administered through the catheter.

Cesarean section was performed with a transverse lower uterine segment incision. Due to the patient's obesity and high adipose tissue, access to the uterus took longer than normal. The result was a baby girl weighing 3500 gr and with Apgar score of 5. Stimulation, drying and Oxygen therapy with Ambobag was performed. A peripheral vein line was established for the infant and 30 cc of lactate Ringer was administered. Neonate s Apgar score gradually increased to 9, and then the baby was transferred to premature infant ward.

The patient received 3 liters serum during the surgery, 1.5 liters Ringer and 1.5 liters Normal Saline. The blood lost during surgery was about one liter. the duration of surgery was about two hours. At the end, in order to reduce movements and possible risks, the patient was recovered in the operating room and then transferred to the ward in good general condition. There was 300 cc clear urine at the end of the operation. Patient's catheter was maintained for one day, for possibility of any complications causing patient's returning to operating room like uterine inertia and postoperative bleeding. After a 12-hour interval with the last dose of Clexane it was removed by the senior anesthesia resident and next dose of Clexane was prescribed 4 hours after. The order was 60 mg BID observing the dose of 0.6 mg / kg / day.

The patient was discharged from the hospital in good general condition after two days. Because we could not obtain the patient’s consent, no photograph of the patient is available.

**Discussion:**

Maternal obesity has become a very common risk factor associated with pregnancy, with a prevalence of 38.3% (6). Considering the possibility of macrosomia of the fetus in these patients, cesarean delivery will be a better choice, (7, 8). The mother's overweight and obesity is also an independent factor for cesarean section (8). One of the issues in these patients is the anesthesia technique.

 In McChlery’s study a combination of spinal and epidural was used (9) and in Wada and Benavidez studies general anesthesia was used (7, 10). In McKinney Dawn study for cesarean section of a patient with a BMI of 63 kg / m 2, they first used the spinal-epidural technique, but due to a failure in the technique, they finally decided to perform general anesthesia (6).

Complications related to anesthesia and maternal mortality, including the occurrence of problems with intubation and aspiration of gastric contents, are high in these people (5), which indicates important risk factors associated with maternal death with general anesthesia. Due to the risks of aspiration and hypoxia, general anesthesia should be avoided as much as possible in these patients (4). In case of cesarean section, regional anesthesia is the best method and inserting an epidural catheter for cesarean delivery is considered a priority for these people. In patients with poor epidural function, a combination of epidural-spinal method with a single-dose spinal method may be preferred because technically it is easier in obese deliveries and allows the duration of the block to be extended if necessary (5). However, doing regional techniques can also be challenging (3). It is also important to note that the absolute contraindication to regional anesthesia is patient dissatisfaction (11). Therefore, it is necessary to obtain patients consent and provide awareness about the risks of general anesthesia. In a case study conducted by Benavidez et al. In 2016 on a pregnant obese patient undergoing cesarean section, since they could not obtain patients consent, surgery was done under general anesthesia (7). In our study, the patient's choice was [Neuraxial block](https://www.google.com/search?client=firefox-b-d&biw=1366&bih=654&sxsrf=ALeKk01jxHzvHf8wdjlAe-FBW7qUGVrDRg:1601189249537&q=neuraxial+block&spell=1&sa=X&ved=2ahUKEwjl577j3ojsAhXPzqQKHcacDMYQkeECKAB6BAgVECU). In obese patients, repeated attempts to perform regional anesthesia are common, and failure of the technique is due to the difficulty of identifying landmarks and unsuccessful epidural needle placement (6).

The rate of primary epidural failure in this population is reported more than 42% (12, 13). For this reason, studies have recommended performing an early epidural during the labor (6).

In obese patients, one of the problems is implantation of peripheral vessels, and when peripheral vessels are difficult to establish, the use of ultrasonography to insert peripheral or central lines may increase the success or decrease the complexity of the process. If peripheral vessel implantation is very difficult, the necessity of having a central venous catheter should be explained for the patient (14). When using a non-invasive sphygmomanometer in these patients, choosing the right size of its cuff is very important because a small sphygmomanometer cuff causes an error in showing high blood pressure (14).

Vertical skin incision is a technique often used in cesarean section in obese pregnant women (15). Because vertical incisions of the skin, compared to transverse incisions, are associated with increasing the time of the surgery, more blood loss, and increasing postoperative pain, the surgical team decided to consider the transverse incision technique for this patient. Due to the patient's obesity and high adipose tissue, access to the uterus took longer than normal. Benevides in his study reported this time about 21 minutes (7) but for our case it was 15 minutes.

In order to achieve normal fluid volume in these patients, fluid assessment should be based on lean muscle mass. Achieving this goal is very difficult because there is a strong association between obesity and diastolic heart failure and may not be well tolerated in patients with a previous underlying disease (14).

Obese patients are at increased risk for surgical wound infection. Fortunately, this patient did not face any surgical wound infection, which indicates complete observance of sterility in the surgical field and during anesthesia, as well as the management of the patient's antibiotic dose by the surgical team.

 **Conclusion:**

Based on the results of this study and considering the prevalence of maternal obesity, as well as the complications of general anesthesia for pregnant woman with excessive obesity, CSA approach, as one of the well-known techniques, is a suitable method for anesthesia management for these patients in cesarean section, considering the benefits of rapid and deep onset of anesthesia and easily extending muscle block by injecting drug into catheter in case of prolonged operation time. Also because the anesthesia management in obese patients is challenging and requires adequate planning, therefore, it is necessary to recommend these patients to refer to anesthesia counseling clinics before giving birth to their child.

**Ethical considerations:**

The study protocol was approved by Research Ethics Committee of Guilan University of Medical Sciences and was registered as IR.GUMS.REC.1399.485

**Declaration of competing interest:**

The authors have no conflicts of interest relevant to this article.

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 None

**Conflicts of interest:**

Nothing to declare.

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