

## Problem-based learning discussion: The morbidly obese parturient

Marcel Vercauteren, Luc Sermeus\*

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The morbidly obese patient and more particularly the extreme obese parturient may signify a major challenge for the anesthesiologist. Progressively more patients present nowadays with extreme overweight with an additional trend of being older than some decades ago.

Based on two patients with BMI  $>65 \text{ kg/m}^2$  the present overview will focus on the problems anesthesiologists are faced with when dealing with such pathology.

### What are the risks ?

It can not be ignored that morbid obesity includes several maternal and neonatal risks affecting morbidity and mortality. The mother may suffer cardiac disease due to afterload increase, left ventricular hypertrophy, pulmonary hypertension, coronary artery disease and peripartum cardiomyopathy. The presence of OSAS may further accentuate pulmonary hypertension due to chronic hypoxia and hypercapnia. Due to lower TLC and FRC patients rapidly become hypoxic. Diabetes, both mellitus and gestational are possible and should be part of a screening process as will also be the presence of pregnancy induced hypertension and preeclampsia. Morbidly obese patients may be at risk for infection such as urinary tract infections, endometritis and wound infection/disruption. Due to increased intra-abdominal mass there may be more aortocaval compression. Labors tend to be longer not infrequently requiring conversion into Cesarean section. Trauma and bleeding are more likely to occur. Thromboprophylaxis is absolutely mandatory. Patients having undergone bariatric surgery may have vitamin deficiencies

\* *Antwerp University Hospital, Belgium*

and may have polyneuropathia. Technical problems will be discussed further. Also the neonate may suffer from maternal obesity. Macrosomia, congenital defects, dystocia (shoulder), instrumental delivery and longer U-D intervals are among the most important problems affecting the neonate. At adult age they seem to be more susceptible to become obese as well.

For both the obstetrician and anesthesiologist obesity may signify marked technical problems. The obstetrician will need more operation time while intervals between incision and delivery may be prolonged. More blood loss may be likely. Fetal monitoring may be difficult. The anesthetist may find difficulty in finding the appropriate cuff for blood pressure monitoring. Vascular access will be difficult either. Intubation may be difficult. Landmarks may not be found. Failures at first attempt up to 42% to find the epidural or intrathecal space have been reported while more than 10% may require more than 3 attempts. Special equipment may be required for intubation and regional anesthesia. Due to fat and soft tissue and the lack of clear bony landmarks there may be a false positive loss of resistance feeling but mostly catheters may not be placed uneventfully in this situation. The sitting position may be the best for the morbidly obese patient as the puncture area will not be covered by fat pads. On the other hand the pressure upon the dura (bulging) and epidural veins may cause more accidental taps of blood or CSF. In case of a dural tap causing PDPH and requiring an EBP may face the anesthetist twice with the same anatomical problem. At least all of this is part of common belief. Catheters may be displaced more easily requiring replacement.

### **Regional anesthesia**

Theoretically all regional techniques are feasible for labor analgesia and C-section anesthesia. For labor analgesia both an epidural and CSE will ensure good analgesia. Care should be taken to keep the opioid doses as low as possible.

For C-section a single dose spinal (SDS) may induce less predictable and titratable blocks. To ensure a 100% success rate one would tend to give a large enough dose although in the morbidly obese this may be problematic as it is commonly believed that these patients need less local anesthetic than the non-obese but it is unclear how much less this might be. To be able to titrate the neuraxial block either epidural, CSE or CSA techniques are possible. Whereas the epidural may be interesting when already present during labor, a CSE technique may be the best option actually. As the epidural space is located more deeply in the obese patient, a small deviation from the midline may signify some centimetres too laterally once the epidural space

is entered. When being too lateral with the epidural needle orifice, introducing the spinal needle may fail to penetrate the dura. Successful puncture of the dura may signify a fair midline approach. The two cases in our hospital received successful CSE anesthesia.

For spinal anesthesia the reduced local anesthetic dose is explained by less CSF. The more obese the larger the epidural space with (ESW) most probably because of more fat deposition and venous distention. How this translates to the space available for local anesthetic spread is more unclear than for spinal anesthesia. More fat and vascular distention may also signify more systemic resorption and deposition of drug substance in fat, thus requiring rather larger dosing. Recently it is suggested that the use of regular dose is fair and that recalculating the dose based upon actual or ideal weight is unnecessary.

Also CSA may be an option as placement of an intrathecal catheter with CSF aspiration may be the best guarantee for a successful spinal anesthetic technique. Some may fear that PDPH may be more likely and that performing an epidural blood patch may face the practitioner with similar technical difficulty as during delivery. Fortunately, the more obese the less likely the occurrence of PDPH. In addition, as the ESW is larger in the obese and the epidural space depth may be overestimated (by exerting too much pressure on the ultrasound probe) the safety margin before an accidental tap occurs may also be larger.

As there may be a need for larger equipment when intending a neuraxial block, an anesthetist may consider general anesthesia when this equipment might not be available. However up to BMI values of 45, fifty per cent of parturients do have an epidural space depth (ESD) less than 7cm whereas another 25% may be helped with 9cm epidural needles (as available in the CSE trays of most companies). It should be remembered that this is not the case when intending a SDS with a 9cm shaft length especially not when using small pencilpoint needles as these needles will have orifices more proximally and will need an introducer preventing full introduction of the spinal needle for another 1-2cm.

### **General anesthesia**

It is commonly accepted that pregnant patients are more difficult to intubate. The incidence of difficult intubation is as high as 1 in 280 intubations as opposed to 1 in more than 2000 for the non-pregnant females. The incidence in case of obesity varies in literature from 1 in 233 to 15% while some even found it to be as high as 33%. Based on a study in our department on 2000 intubations in non-pregnant patients of whom over 300 had

a BMI>30, the incidence of a difficult intubation score was 16% versus the incidence of 10% in patients with BMI<30. The Mallampati score 3-4 was a better indicator (Odds ratio 8) for difficult intubation. Due to this we believe that fear for intubation problems is overemphasized. This is also supported by several large series reported in literature.

Pregnant patients may never be considered to have an empty stomach. Aspiration of gastric content and the risk for pulmonary damage depends on acidity and volume of the gastric content.

However several studies found that in the obese there is no reason to believe that intragastric volume, acidity or rate of emptying would be different as compared to the non-obese population or that gastric emptying would be more delayed in the obese. On the other hand the anesthetist should be aware that other factors may play a role in the obese such as the presence of a hiatal hernia, reflux and diabetes (affecting gastric emptying due to polyneuropathy). Mask ventilation (if applied) may be more difficult while gastric inflation may increase the risk of regurgitation of gastric content. Prophylaxis remains absolutely crucial.

### Conclusion

Fear to perform regional anesthesia in the morbidly obese may be unfounded. When performing neuraxial analgesia or anesthesia the sitting position may offer the most optimal conditions. The patients may help to guide the needles to a midline plane. Needles rarely need to be longer than in the non-obese. This does not signify that anesthetist should not be prepared to convert to general anesthesia, having (difficult) intubation equipment ready. Pre-delivery screening for diabetes, hypertension and intubation anatomy may also help to anticipate possible problems. The use of ultrasound may be of some help however with certain limitations.