Operating on the obese woman—a review

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In this review the authors recognise the growing contribution of obesity to problems in obstetrics and gynaecology. They then focus on methods to reduce complications in intrapartum and gynaecological care particularly in relation to operating on the obese woman. Strategies to reduce surgical morbidity are discussed including consideration of the site of incision, asepsis and reduction in postoperative complications.

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Introduction

We live in an obesogenic society where people are addicted to fast food and supermarkets and a sedentary lifestyle promoted by television and cars. The prevalence of obesity is already above the critical threshold of 15% as defined by the World Health Organization (WHO) definition of epidemics needing intervention, and this obesity epidemic has significant implications for physical, mental and social health worldwide.1

A UK House of Commons Health Committee report predicted obesity as likely to overtake smoking as the leading UK health problem.2 The WHO has identified obesity as one of the most blatantly obvious yet most neglected world health problems and as the sixth most significant cause of ill health worldwide.3 The House of Commons report highlighted easy access to food and little need for exercise as significant factors.

Few antiobesity strategies have been shown to be effective. The only interventions well supported by research evidence of benefit are surgery for morbid obesity, drug therapies and multicomponent weight loss programmes which include diet, exercise and behavioural therapy.4 Some feel that only by changing the structure of our cities, so that people are forced to walk and cycle more, can these trends in obesity be altered.

Drug therapies include targeting a reduction in fat absorption or reducing appetite. Surgery for morbid obesity (bariatric surgery) aims to affect stomach capacity and absorption. The most common bariatric procedures used are laparoscopic adjustable gastric banding, Roux-en-Y gastric bypass and biliopancreatic bypass with duodenal switch. None of these interventions has a rapid effect; therefore, when faced with operating on an obese woman with an obstetric or gynaecological problem, we require a strategy to minimise risks and complications.

Obstetrics and gynaecology—extent of the problem

Obesity is no longer a problem limited to North Americans, and an estimated 30 000 deaths in the UK each year are attributable to it.5 The extent of the problem of obesity in obstetrics and gynaecology is very apparent both in clinical practice and on reviewing the medical literature. The WHO accepts a body mass index (BMI) of 25.0 kg/m² or greater to define overweight and one of 30.0 kg/m² or more as obese. Mokdad et al.6 found an almost doubling in the incidence of obesity in women in the USA in the 10-year period from 1991–2001.

Obstetrics

In a retrospective case note analysis, a group from a Glasgow maternity hospital examined BMI at booking in 1990 and again in the period 2002–04.7 They identified a mean increase in BMI of 1.37 kg/m² over this period, when adjusted for age, parity, social deprivation and smoking status. Moreover, they identified a two-fold increase in the number of women with a BMI in the obese range at booking.

Yeh and Shelton8 reviewed 79 000 deliveries from 1999–2003 in upstate New York and demonstrated a significant increase in BMI across all subgroups of the population studied. They identified a mean increase in BMI of 1.37 kg/m² over this period, when adjusted for age, parity, social deprivation and smoking status. Moreover, they identified a two-fold increase in the number of women with a BMI in the obese range at booking.

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This increase in obesity is likely to be associated with an increase in complications of pregnancy, with implications for pregnant women, the fetus, obstetricians and midwives. Sebire et al.9 in 2001 reviewed almost 300 000 maternities in the North Thames region and examined antenatal and intrapartum complications, maternal morbidity and neonatal outcomes in relation to BMI. The results were expressed as

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adjusted odds ratios following logistic regression analysis. They found gestational diabetes, pre-eclampsia, induction of labour, emergency caesarean section, postpartum haemorrhage, genital tract infection, urinary tract infection, wound infection, birthweight above the 90th centile and intrauterine fetal death all significantly more likely to occur in obese pregnant women compared with women of normal BMI. With increased rates of macrosomia, induction of labour and pre-eclampsia in women with a BMI in the obese range, it is not difficult to see why caesarean section rates are increased. In 2005, a group from Seattle, in a prospective cohort study\textsuperscript{10} of primigravidae, examined the relationship between maternal prepregnancy adiposity and caesarean section. They found that women who were overweight (BMI 25.0–29.99 kg/m\textsuperscript{2}) had a two-fold increased risk of caesarean section compared with women of normal BMI and women who were obese had a three-fold increased risk of caesarean section.

In a large observational study of primigravidae in South Glamorgan between 1990 and 1999, a doubling in incidence of obesity was identified and significantly increased risks of postdates pregnancy and induction, caesarean section, failed instrumental delivery, macrosomia and shoulder dystocia.\textsuperscript{11} There was also an increased risk of birth trauma and admission to the neonatal unit to assist with feeding and body temperature control in babies born to women with a BMI greater than 30 kg/m\textsuperscript{2}.

In the most recent Confidential Enquiry into Maternal Deaths (CEMD), obesity was identified as a factor in more than 30% of cases, and in some, it was seen to be related to broader social issues, including acting as a barrier to receiving care.\textsuperscript{12}

It seems clear that increasing numbers of overweight and obese women will require obstetric intervention. Obesity needs to be recognised so that a plan for the care and delivery of these women can be formulated.

All women should have BMI measured at booking and recorded in the case notes. Women with a BMI of >30 kg/m\textsuperscript{2} should be identified as high-risk women and, therefore, they need obstetrician-led care and an antenatal review by an obstetric anaesthetist in an obstetric anaesthesia clinic where possible, as such women are also at increased risk of anaesthetic intervention.\textsuperscript{13} Any specific issues relating to the care of a particular woman can then be highlighted in the special features section of the case notes to alert the staff who will care for her in the intrapartum and postnatal periods.

Trial of labour following caesarean section is part of the current strategy to reduce the overall caesarean section rate. Obese women, as already discussed, have an increased risk of primary caesarean section. Obstetricians are anxious about performing repeat caesarean sections in this group because of the increased operative morbidity but similarly are concerned about failed trial of labour and emergency caesarean section with its associated morbidities. Successful trial of labour in the nonobese population is associated with lower rates of maternal morbidity than that in repeat caesarean section.\textsuperscript{14} However, there has been limited examination of the role of BMI in successful vaginal birth after caesarean section (VBAC). In a retrospective analysis between two centres, each with similar VBAC practices and success rates of the order of 70%, Bujold et al.\textsuperscript{15} analysed the contribution of BMI to success and found a overall VBAC rate of up to 50% in women with BMI of 30 kg/m\textsuperscript{2} and greater but a linear relationship between increasing BMI and failure of VBAC. There were no significant differences in maternal or neonatal morbidity in the VBAC or elective caesarean groups. Edwards et al.\textsuperscript{16} in another retrospective analysis compared outcome in obese women with a history of one prior caesarean section undergoing trial of VBAC or elective caesarean section at term. They reported an overall successful VBAC rate in excess of 45% in women with a BMI of 40 kg/m\textsuperscript{2} or greater. However, there was three-fold increase in puerperal infection in the planned VBAC group (defined as chorioamnionitis, endometritis or wound infection). The study was limited by small numbers in each group. They analysed cost to the healthcare system based on length of hospital stay, labour and supplies and concluded that a VBAC success rate of 83% was required to save $500 per patient. VBAC in obese women does appear to be a feasible option, but the suitability of each case should be assessed individually by a senior obstetrician.

**Bariatric surgery and pregnancy**

Increasing numbers of women are undergoing bariatric procedures to manage obesity. The original gastric bypass procedures are becoming replaced by gastric banding techniques, which significantly reduce stomach capacity. Many of these procedures are performed laparoscopically. Pregnancy after such surgery is becoming more common and successful pregnancies have been achieved. Women are advised to avoid pregnancy until weight loss has stabilised. Complications have been reported during pregnancy, including life-threatening gastrointestinal haemorrhage following synthetic gastric band erosion,\textsuperscript{17} iron deficiency anaemia and other nutritional deficiencies including folic acid and vitamin B12, intrauterine growth restriction and fetal neural tube defects.\textsuperscript{18} The studies are generally small, but in a larger retrospective study of 298 pregnancies with a previous history of bariatric surgery within a cohort of 160 000 deliveries, Sheiner et al.\textsuperscript{19} found no significant differences in pregnancy outcome between open or laparoscopic bariatric surgery. Women who had bariatric surgery were still more likely to be obese than women who had no previous surgery and had a two-fold increased risk of caesarean section.\textsuperscript{19}

**Weight loss during pregnancy**

There is little experience of either serious dieting to achieve weight loss during pregnancy or of the use of drugs to assist in
Operating on the obese parturient

Making plans to operate on an obese parturient should include strategies for the elective and the emergency situation, in case labour begins before the date of caesarean section. In our unit, in cases of super obesity (BMI of 50 kg/m²) or greater when there is a prospect of them needing surgery, e.g. repeat caesarean section, the safe delivery of such women has been facilitated by multidisciplinary team work and prior planning. The team includes obstetricians, a consultant and usually two experienced trainees, a consultant obstetric anaesthetist, theatre staff and midwives. When in hospital, it is useful to arrange for the woman to have help and advice from a dietician. Postoperative physiotherapy is beneficial in terms of resuming mobility and reducing risk of venous thrombo-embolism. The tissue viability nurse can be of enormous help if there is a wound problem.

Preoperative preparation

A standard modern operating table supports a body weight of 130–160 kg (Maquet Gmbh & Co., Rastatt, Germany). In some cases, side extensions are available to support extra width. Newer tables supporting weights of 225 kg and in some cases up to 360 kg, and including lithotomy stirrups, are commercially available (Allen Medical Systems, Acton, MA). It is important to check the weight limit of the table in one’s own unit. In situations where the maternal weight is in excess of that supportable by the operating table, it is necessary to operate with the woman on a bed. However, standard hospital beds only support a weight of 230 kg. Moreover, operating on a bed is usually suboptimal in that it makes access more difficult and is awkward and uncomfortable for the obstetrician, assistants and anaesthetist.

Anaesthesia is discussed in a separate article in this journal and the increased incidence of significant difficulties has been alluded to earlier. The obstetrician must also be aware of the increased time required to perform regional or general anaesthesia in obese pregnant women and the impact that may have, e.g. in cases of suspected fetal compromise. Obese pregnant women often have concomitant medical problems that must also be addressed.

Wound asepsis is an important area as these women are at increased risk of wound infection and subsequent complications. There is thought to be some value in reducing skin colonisation and subsequent wound infection by preparing the skin with a povidone iodine solution (or similar) 30–40 minutes preoperatively and then once the anaesthetic is effective and the woman positioned on the table/bed to cleanse the abdomen once more in the usual fashion. It is important to take special care under the panniculus and in the groin area.

Technique

The abdominal wall anatomy is distorted by a large panniculus. The umbilicus is located caudad to its normal position. If a midline incision is made, it is essential to take care not to ‘buttonhole’ the pannus. If a transverse incision is made, care should be taken to avoid the area under the panniculus as wound complications will be higher. If a vertical incision is made but still not possible to access the pelvis with usual surgical instruments, a panniculectomy may be required. This, however, is not a procedure that can be performed safely for the first time and in such a situation (in such a case, care must be taken to use adequate subcuticular drains postoperatively as there is a significant risk of fluid collection and seroma formation.) The type of incision that is preferable has been much debated but will be affected by individual factors and can therefore vary from woman to woman. It is vital that the incision is adequate as poor access will make retraction more physically demanding, prolong operating times and compound problems. Some favour the Pfannenstiel type incision as it permits effective wound closure and less postoperative pain and with that earlier mobility and easier respiratory effort. However, the wound is at increased risk of infection if it lies between folds of skin. A large pannus predisposes to seroma formation and both are associated with wound dehiscence. Midline or vertical incisions are associated with more postoperative pain, dehiscence and hernia formation, but with correct closure, the latter two can be minimised. Some obstetricians and gynaecologists have advocated midline supra-umbilical incisions or transverse incisions above the pannus. The abdominal wall is often thinner there, particularly above the umbilicus, enabling better access and therefore improved operating conditions. In some instances, when the pannus pulls the abdominal wall downwards, a transverse incision at the level of the umbilicus allows excellent access to the uterus. In each case, individual assessment is recommended. In all cases, however, wound complications are uniformly higher than in the nonobese women.

Standard surgical equipment does not facilitate access to the pelvis in an obese woman. Some departments have longer instruments available; they can be purchased readily from surgical supply companies. A standard Doyen type of retractor will be ineffective in this situation. A retractor with a deeper blade, e.g. a St Mark’s retractor, malleable copper retractors and circular self-retaining retractors all have a role.

Good haemostasis is important at the time of skin incision and closure to reduce the risk of wound infection and is facilitated by the use of electrodiathermy. Effective haemostasis is clearly also crucial in the pelvis as postoperatively these women are difficult to assess in terms of intra-abdomi-
inal bleeding, and subsequent laparotomy carries significant risks including those of further anaesthesia.

When closing a transverse incision, usually the peritoneum need not be closed as this does not add strength to the wound and spontaneous closure will occur in 24–48 hours.28 The rectus muscles should be inspected carefully and electrodiathermy employed to reduce the risk of haematoma formation. The rectus sheath must be closed securely, and a suture with delayed absorption such as polydioxanone (PDS, Johnson & Johnson Medical Ltd, UK) or polyglyconate (Maxon, Mansfield, MA) is useful. It invokes little tissue reaction and maintains half of its tensile strength at 4 weeks. With a vertical incision, single-layer mass closure with PDS taking bites of peritoneum, muscle and fascia 1–1.5 cm apart and 1.5–2 cm from the fascial edges is relatively quick and effective.29 The skin can then be closed with interrupted mattress sutures and staples in between.

Use or otherwise of a drain in the subcutaneous fat layer at the time of caesarean section was evaluated in a Cochrane review30 where the authors assessed wound complications, febrile morbidity and endometritis in women with and without wound drains. Seven small studies were included. The authors concluded that there is no evidence to suggest that the routine use of a wound drain confers benefit. Further studies to examine the role of wound drains of different type, in women with different degrees of obesity, where haemostasis is not felt to be adequate, where repeat caesarean section is performed and comparing intrapartum caesarean section with prelabour caesarean section would be of value.

Standard antibiotic prophylaxis at the time of caesarean section is advocated for all women31 to reduce the incidence of wound infection and endometritis. Obese women have a greater volume of distribution;32 therefore, it is reasonable (but not evidence based) to administer a larger dose than in the nonobese women, e.g. 1.5 g intravenous cefuroxime.

**Postoperative care**

With the aim of early identification of wound and other postoperative problems, these women warrant daily review by a consultant obstetrician. Thromboprophylaxis is essential, and these women should be fitted with thromboembolic deterrent stockings (TEDs). Thromboprophylaxis with low-molecular-weight heparin is essential in the postoperative period due to the increased risk of venous thromboembolism.33 Timing of the dose should be discussed with the obstetric anaesthetist, particularly in relation to removal of the epidural catheter. Standard prophylaxis with 40 mg subcutaneous enoxaparin will not be adequate, and we advocate a dose of 80 mg daily until discharge and then 40 mg daily for 2 weeks after discharge if mobility is likely to be reduced.34 It may be difficult to obtain full-length TEDs of an appropriate size, but in the elective situation, there should be time to have the patient measured and a customised pair made. Prompt mobilisation and avoidance of dehydration are also important.

**Assisted vaginal delivery**

It has previously been noted that obese women in labour are at greater risk of fetal macrosomia, shoulder dystocia, postpartum haemorrhage and failed instrumental delivery. When performing an assisted vaginal delivery in such a case, it is essential to have an appropriately experienced obstetrician and assistant to deal with these problems, should they arise. It is often difficult to assess the position and attitude of the vertex and, in addition, to perform the manoeuvres required to manage shoulder dystocia. Good lighting and an appropriate bed or theatre table need to be available and adequate analgesia/regional anaesthesia provided.

**Gynaecological surgery**

Just as in obstetrics, increasingly women attending the gynaecology clinic are obese. The same principles apply to carrying out operations. There is one crucial difference, however. Very many gynaecology patients do not need operations, so it is best to avoid operating on the obese women if at all possible. ‘Does she really need this operation? ’ ‘Will this operation be effective?’ These are the questions that should be asked in all women but more especially so in obese women whose operative risks are higher. The gestagen intrauterine releasing system (Mirena, Shering H.C. Ltd., West Sussex, UK) is a wonderful invention for menorrhagia, and very often, there are other effective nonsurgical therapies available. Ring pessaries are often very effective for prolapse and have little morbidity. Likewise, drugs such as Luteinsling hormone-releasing hormone agonists are useful in endometriosis and fibroids. It might be argued that for too long both gynaecologists and patients have been addicted to operative treatments. In obese patients, it is important to investigate alternatives to surgery. There may be certain surgical procedures that are particularly suited to obese women. For instance, it has been suggested that tension-free vaginal tape procedures are very suitable for obese women and stress incontinence.35 An alternative view might be that weight loss, although difficult to achieve, would be better treatment.

There will of course be those women who require operations. One thinks particularly of women with endometrial carcinoma who are frequently obese. In these cases, the same principles apply as for the obstetric patients. There must be proper consultation with appropriate medical and anaesthetic colleagues and careful planning of the surgery, paying special attention to the three main hazards of operation: blood loss, infection and thromboembolism. The site of the incision must be carefully considered. Although
there are no hard and fast rules, in general, there is a lot to be said for an incision not buried under the pannus of fat, so that fresh air can help keep the wound dry. This is perhaps particularly important in these days of Methicillin-resistant Staphylococcus aureus. Care with haemostasis, prophylactic antibiotics and measures to reduce the risk of thromboembolism should of course be employed.

Laparoscopic surgery can be used safely for appropriate indications by surgeons who have wide experience of such procedures. Obesity can add to the difficulty of such surgery, particularly in the production of the pneumoperitoneum.

Risk management

While it is useful to have a protocol or guideline in place for the management of the obese woman, ultimately one needs to be prepared to adapt and individualise management according to the clinical situation of that woman. Following discharge of the woman, it is important to communicate the findings and outcome to the woman’s GP or other referring doctor as well as any plans for follow up or treatment in the community setting. Risk assessment and analysis in such cases is a useful tool to identify areas where things went well and others areas where changes in practice may improve outcome in a future case.

Ethics

It is important to involve these women and their partners in open and frank discussions about their care and the risks involved. To neglect discussing their obesity is paternalistic and should be avoided—they are usually very aware of it. It is, however, essential that we treat them with respect and dignity as we would treat any other patient. These women often have low self-esteem and are embarrassed about their body habitus. All staff involved in their care should be sensitive to their needs. It is also worth remembering that the mother’s interests override those of the fetus and we must not risk the mother in the fetal interest—e.g. in a case of suspected fetal compromise where caesarean section is required but the senior anaesthetist and obstetrician are not immediately available. Analysis of anaesthetic-related deaths in the most recent CEMD highlighted the problem of general anaesthesia performed by inexperienced staff in stressful situations.

Conclusion

Obesity is a big problem getting bigger. Progressively more obstetricians and gynaecologists are faced with operating on obese women. All doctors caring for these women should be aware of the specific problems that they face; individual units should consider development of guidelines for their management and the importance of team working should be emphasised. Doctors should consider whether or not the operation is necessary and likely to be of benefit, inform the woman of the risks and relevance of them to her and, where possible, involve the woman in decision making.

In broader terms, perhaps we also have a role to play in improving awareness of the importance of eating less and exercising more; slow food not fast food, walking and cycling not cars and television. With a concerted worldwide effort, perhaps this global epidemic can be halted.


