Reminder of important clinical lesson

Bilateral primary spontaneous pneumothoraces postcaesarean section – another reason to avoid general anaesthesia in pregnancy

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A 36-year-old, healthy, primiparous female underwent a caesarean section under general anaesthetic. She had previously had a severe reaction to dye during a myelogram and therefore, had declined epidural analgesia or regional anaesthesia. Induction and maintenance of anaesthesia was uneventful, but on emergence, and before tracheal extubation, the patient coughed on the endotracheal tube and almost immediately developed right-sided subcutaneous emphysema of the face and neck. At this point her oxygen saturation began to fall and she was noted to be difficult to ventilate. Clinically and radiologically, she had a right-sided pneumothorax which was treated immediately with intercostal drain insertion. She went on to develop a left pneumothorax which also required intercostal drain insertion. She made an uneventful recovery and was discharged 8 days later. A subsequent CT scan of her chest revealed no pre-existing primary pulmonary pathology that would have accounted for the pneumothoraces.

BACKGROUND

Primary spontaneous pneumothorax (PSP) is rare in pregnant women with less than 50 cases reported in the literature before 2007.¹ Before now, it has only twice been reported after caesarean section, with all three patients having had a general anaesthetic.^{2,3} Barotrauma secondary to positive pressure ventilation via the endotracheal tube is thought to be a key contributory factor, and coughing on the endotracheal tube before extubation can of itself produce high intrathoracic pressures. Our case is unique in that the pneumothorax was bilateral, and illustrates a potentially life threatening complication of general anaesthesia in pregnancy. When taking into account other relevant complications such as failed intubation and Mendelson's syndrome, this case highlights the need to avoid surgery under general anaesthesia in favour of regional anaesthesia when at all possible.

CASE PRESENTATION

A 36-year-old, healthy, non-smoking, Caucasian primiparous female was admitted at 41 weeks gestation for induction of labour. Her medical history included endometriosis, chronic back pain and near fatal chemical meningitis following dye insertion during a myelogram. There was no personal or family history of pulmonary disease.

An artificial rupture of membranes was performed and a syntocinon infusion was commenced. However, 2 h into labour she requested a caesarean section under general anaesthesia because she was unable to cope with the contraction pains. She did not wish epidural analgesia for pain relief or regional anaesthesia due to her previous history of chemical meningitis.

Induction and maintenance of anaesthesia was uneventful. In particular, she was a grade one intubation which was entirely atraumatic. She was paralysed and ventilated throughout the procedure with peak airway pressures of less than 20 cm H₂O. The surgery was uneventful and a live male infant weighting 4260 g was born in good condition. In cases such as this it is usual to extubate the patient's trachea awake and in the left lateral position, but on emergence from anaesthesia the patient coughed on the endotracheal tube and almost immediately developed a crepitating swelling of the right side of her face and neck, suggestive of subcutaneous emphysema. She was noted to be difficult to ventilate and her oxygen saturations dropped from 96% to 70% despite ventilation with 100% oxygen. Examination of her chest revealed reduced air entry and hyper-resonance on the right side although the trachea was midline. At this point significant pneumothorax was diagnosed and arrangements were made for right intercostal chest drain insertion. Tension pneumothorax was not diagnosed as the trachea was central and the patient was cardiovascularly stable.

INVESTIGATIONS

An emergency chest radiograph confirmed a right-sided pneumothorax, midline shift and significant subcutaneous emphysema (figure 1). Midline shift revealed that the pneumothorax was actually tensioning. A small left pneumothorax was queried at the time, but not treated.

TREATMENT

Bronchoscopy via the endotracheal tube was normal which ruled out trauma to the upper airway. A right-sided chest drain was inserted with immediate improvement in

Figure 1 Chest radiograph showing a right-sided pneumothorax, midline shift and significant subcutaneous emphysema.

Figure 2 Chest radiograph showing re-expansion of the right lung after a chest drain was inserted.

oxygenation allowing a reduction in inspired oxygen fraction from 100% to 55%. Re-expansion of the right lung was evident on a chest radiograph about 45 min later (figure 2). She was subsequently extubated uneventfully and transferred to the high dependency unit.

A repeat chest radiograph on the following day confirmed re-expansion of the right lung but now with a large left-sided pneumothorax (figure 3). This was drained successfully while the right chest drain was removed (figure 4).

The left drain was removed the next day and all subsequent imaging showed fully re-expanded lungs bilaterally (figure 5).

OUTCOME AND FOLLOW-UP

She made an uneventful recovery and a follow-up chest CT was normal other than a 6 mm cyst within the right upper

Figure 3 Chest radiograph from the following day confirming re-expansion of the right lung and a large persistent left-sided pneumothorax.

Figure 4 Chest radiograph showing drainage of the left-sided pneumothorax.

lobe which was not adjacent to the pleural surface and not thought by the radiologists to be clinically significant. The patient was discharged from hospital 8 days postcaesarean section.

DISCUSSION

PSP is very rare in pregnancy. The true incidence of this condition is unknown and has been estimated as 1 in 10 000 deliveries.¹ It classically presents with sudden onset shortness of breath, decreased air entry and hyper-resonance on the affected side and may lead to cardiovascular compromise and even death.

Rapid action is especially important in the pregnant woman due their increased oxygen requirements and the restriction of lung function caused by the gravid uterus. In addition, if the woman has not yet delivered, the hypoxia may have an adverse effect on the fetus.

Figure 5 Chest radiograph confirming re-expansion of both lungs.

PSP has been known to occur in patients suffering from hyperemesis gravidarum, during rapid breathing in labour and during caesarean section under general anaesthetic. Regarding general anaesthesia, laceration of the pharynx, barotrauma caused by positive pressure ventilation, the use of nitrous oxide and coughing induced by extubation have all been reported as contributing factors.^{1 2} Risk factors are thought to include smoking, cocaine use and previous history of a pneumothorax, chest infection or asthma.

Treatment options include conservative, simple aspiration and insertion of chest drains although no nationally approved guidelines about treatment in pregnancy exist. High recurrence rates have been reported and consideration should be given to an elective thoracic surgical procedure in subsequent pregnancies.⁴

Some authors have suggested that the safest mode of delivery in a pregnant woman with a previous history of a pneumothorax would be an assisted vaginal delivery and

the avoidance of general anaesthesia should a caesarean section be required for obstetric indications.¹

Considering the potentially serious outcomes for the mother and baby following this complication from general anaesthesia, clinicians should try to avoid its use in favour of regional anaesthetic when at all possible.

Learning points

- ▶ PSP is rare in pregnancy and is estimated to occur in about 1 in 10 000 deliveries and is a known complication of general anaesthesia, with barotrauma potentially being one of the key contributory factors.
- ▶ Early recognition and treatment, which may involve aspiration or insertion of a chest drain, is paramount to avoid death or morbidity in the mother or fetus.
- ▶ Consideration of an elective assisted delivery in a subsequent pregnancy may be appropriate due to the potential for recurrence.
- ▶ Clinicians should aim to avoid general anaesthesia in favour of regional anaesthesia where at all possible.
- ▶ Consideration should be given to developing joint national guidelines between the Royal College of Obstetricians and Gynaecologists and the Royal College of Anaesthetists about the management of PSP in pregnancy.

Competing interests None.

Patient consent Obtained.

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Please cite this article as follows (you will need to access the article online to obtain the date of publication).

Aye CYL, McKean D, Dark A, Akinsola SA. Bilateral primary spontaneous pneumothoraces postcaesarean section – another reason to avoid general anaesthesia in pregnancy. *BMJ Case Reports* 2012;10.1136/bcr.02.2012.5724, Published XXX

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