

exists is case report or patient cohort based. It has been reported that pregnancy should be avoided in those affected by EDS type IV, even to the extent of recommending termination [2,4,5].

Vaginal delivery may be hazardous as uterine contractions and pushing may increase the risk of uterine rupture. The increase in intra-abdominal pressure and blood pressure associated with pushing may result in hollow viscus or vessel rupture respectively [4,6]. Instrumental delivery may help reduce these risks but may result in an increased risk of perineal trauma. Haemostasis and repair may then pose major problems [6].

The use of epidural analgesia may reduce excessive maternal effort and also the sympathetic responses to pain but neuroaxial blockade may itself be harmful. Firstly although standard coagulation tests are usually normal, clotting factor deficiencies and platelet abnormalities have been described [4,6]. Epidural veins are likely to be more fragile and there is a theoretical increased risk of epidural haematoma.

Caesarean section may be advocated as a more controlled manner of delivery but there may be difficulty in achieving haemostasis due to tissue fragility. The choice of anaesthesia is also not clear. Spinal anaesthesia may not provide sufficient duration of block if problems with haemostasis are encountered and so combined spinal and epidural may be beneficial [4]. However, if major haemorrhage is encountered, profound sympathetic blockade may have a deleterious effect on the outcome for the patient. A general anaesthetic may therefore provide a more controlled environment. A hypertensive response to intubation should be avoided

and manipulation of the neck must be done with care due to potential cervical spine instability [4,6].

This case is reported to raise awareness of a rare and potentially devastating disease that may first present during pregnancy. It is not possible to offer recommendations as to the best management of a pregnant woman with EDS IV but awareness of the issues concerning delivery may help a multidisciplinary team achieve a plan that minimizes potential risks and is acceptable to the mother and her partner.

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Regional anaesthesia for Caesarean section in an ankylosing spondylitic patient with twin pregnancy

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EDITOR:

Ankylosing spondylitis can pose several anaesthetic and obstetric problems during pregnancy. This disease presents a unique scenario of difficult airway and difficult 'back'. Ankylosing spondylitis is a pre-

dominantly axial form of arthritis that usually begins in the sacroiliac joints and slowly progresses to spinal fusion. It presents initially with chronic lower back pain or stiffness. The estimated male to female ratio is between 4:1 and 6:1 [1–3] with HLA-B27 antigen association. As the peak incidence is in the young adult population [2,3], pregnancy may occur.

Case report

A 33-yr-old female patient with a 5-yr history of ankylosing spondylitis who was taking sulphasalazine

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had *in vitro* fertilization resulting in a twin pregnancy. She had severe spinal involvement with lumbar spondylosis at L4/5, sacroilitis and cervical spine involvement. Sulphasalazine was stopped at 8 weeks of gestation due to risk of kernicterus in the newborn.

Antenatal follow-up was uneventful except that in the second trimester she complained of presyncope and slight breathlessness on walking. Two-dimensional echocardiography showed normal valves and normal left ventricular function. Her symptoms were attributed to physiological pregnancy changes. As there was severe spinal and sacroiliac involvement, mechanical problems with progress of labour and vaginal delivery were expected especially in this parturient with twin pregnancy. Caesarean delivery was planned at 37 weeks of gestation and she was referred to the preanaesthetic clinic at 35 weeks of gestation.

She was 59.2 kg in weight, 161 cm in height, with a body mass index (BMI) of 22.8. She had limited neck flexion of 20 degrees, very limited neck extension, but did not experience neck tenderness. She had a mouth opening of two finger breadths and a Mallampati Grade III airway. Back examination revealed a very stiff lower back, reduced interspinous spaces at L3/4 and L2/3 and a classic 'bamboo spine' appearance. She had no neurological complaints or deficits. No cardiac murmur was heard and respiratory examination was unremarkable. She was counselled regarding combined spinal–epidural anaesthesia during her Caesarean delivery with possible conversion to general anaesthesia with awake fiberoptic intubation.

A difficult airway trolley and a fiberoptic bronchoscope were on standby in the operating theatre. No premedication had been administered. An 18-G intravenous cannula was inserted and non-invasive blood pressure (BP), electrocardiography and pulse oximetry monitoring were established. After preloading with 500 mL of crystalloid, a combined spinal–epidural anaesthetic was attempted in the sitting position.

After cleaning, draping and skin infiltration with 1.5% lidocaine, a lateral approach was taken. The first attempt was unsuccessful as there was difficulty advancing the Tuohy needle. On the second attempt the epidural space was identified using loss of resistance to air at 5 cm from the skin. A spinal needle was inserted through the Tuohy needle and heavy bupivacaine 2.0 mL with 100 µg morphine was administered upon visualization of clear free-flowing cerebrospinal fluid. However, there was difficulty with threading the epidural catheter despite injection of saline through the epidural needle and fine adjustment of the Tuohy needle and thus it was abandoned. A T5 level of loss of sensation to cold with a Bromage score of 3 was achieved. BP was maintained with

phenylephrine 300 µg in total. She was breathing spontaneously on room air and no desaturation was observed. A senior obstetrician performed the Caesarean delivery. Twin 1 was cephalic and delivered with Wrigley's forceps. Twin 2 was breech and breech extraction was performed. Both twins had APGAR scores of 9 at 1 min and 5 min. The estimated blood loss was 300 mL.

Postoperatively, she had a pain score of 0 and remained haemodynamically stable in the postoperative anaesthetic care unit. She was able to eat and drink within 6 h postoperatively. She was fully ambulant by postoperative day 1 and was discharged on postoperative day 3. Postoperative anaesthetic review revealed no neurological complications related to the regional technique.

Discussion

Although the anaesthetic management of pregnancy in the presence of ankylosing spondylitis has been described before [4–6], this is the first case reported in twin pregnancy from *in vitro* fertilization undergoing Caesarean delivery. Severe postural and joint deformity of ankylosing spondylitis posed interesting challenges to the anaesthetist and there are few published data on care during pregnancy. It involves management of the difficult airway and difficult 'back'. The physical back deformities result in a high risk of neuraxial block failure [7]. In one study involving neuraxial anaesthesia for lower limb surgery, neuraxial access consisted of 13 spinal and three epidural attempts. Spinal anaesthesia was possible in 10 (76.2%) cases and failed in three (23.8%). Epidural anaesthesia was unsuccessful at each attempt. Spinal anaesthesia is therefore advocated for neuraxial anaesthesia in ankylosing spondylitis.

If epidural anaesthesia is required, a paramedian or lateral approach is preferred. In this case, a lateral approach with combined spinal–epidural technique was used and spinal anaesthesia administered. However, there was difficulty in threading the epidural catheter. Methods to assist catheter insertion include paramedian or lateral approach and injection of saline through the epidural needle, to open up the epidural space. Placement of an epidural catheter in the parturient may be technically difficult, as there is calcification of interspinous ligaments, osteophyte formation with fusion of the vertebral column and ankylosis of the lumbar region, which may lead to difficulty threading the epidural catheter. As such, a normal dose of local anaesthetic should be administered because an epidural top-up may not be possible if the epidural catheter cannot be inserted. A sequential combined spinal–epidural technique is not advocated. As neurological complications may be a

contraindication to regional anaesthesia, a careful neurological history and examination must be conducted to document any deficits.

General anaesthesia may be required if the neuraxial blockade proves difficult, fails or is inadequate. The difficult intubation trolley and flexible fiberoptic intubating bronchoscope should be available in the operating theatre. Cervical spine ankylosis, temporomandibular ankylosis and cricoarythenoid arthritis may lead to difficult intubation. Loss of normal neck flexion and extension, coupled with osteoporosis, may lead to fracture with minor trauma from airway manipulation. A thorough airway assessment including range of movement of neck, head and cervical spine, and predictors of ease of intubation such as Mallampati scoring should be undertaken.

Successful management of a parturient with ankylosing spondylitis with a difficult airway and difficult 'back' is challenging and requires a multidisciplinary approach. It involves the rheumatologist, obstetrician, anaesthetist and neonatologist. Neuraxial anaesthesia can be considered and a lateral approach should be used. A normal dose of spinal local anaesthetic can achieve an adequate level of block, although epidural catheter insertion may be difficult.

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Clinical evaluation of the Capnomask™ in the supine vs. prone position during monitored anaesthesia care

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EDITOR:

A large number of interventional radiologic procedures are performed under monitored anaesthesia care (MAC). This entails the administration of low doses of intravenous (i.v.) anaesthetic drugs, oxygen via a nasal cannula or face mask and standard monitoring in spontaneously breathing patients [1]. Despite its benefits in improving patient comfort, procedural sedation/analgesia may potentially worsen airway patency, leading to apnoea, hypoventilation and hypoxia. Capnography monitoring can detect early signs of respiratory depression during MAC [2]. The Capnomask™ (GHW group, Meylan, France) is a

newly developed oxygen face mask with an end-tidal CO₂ (ETCO₂) sampling line intended for use in spontaneously breathing patients under light sedation. We examined its feasibility for capnography monitoring and patients' tolerance in the supine and prone positions during MAC.

Forty-five patients (ASA II–III, 24 males/21 females, age: 65.5 ± 12.9 yr, height: 164 ± 8.1 cm and weight: 66.4 ± 9.7 kg) scheduled for radio-guided percutaneous vertebroplasty or nucleotomy were prospectively included. The Capnomask™ was placed on the patient's face with oxygen delivery (6 L min⁻¹) and the CO₂ sampling line was connected to a capnometer. All the patients received i.v. midazolam (0.03 mg kg⁻¹) and alfentanil (15 mcg kg⁻¹ h⁻¹). Non-invasive blood pressure (BP), heart rate (HR), ETCO₂, pulse oxymetry (SpO₂) and respiratory rate (RR) were noted at steady state in the supine and 5 min after placement in the prone position. Sedation

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