An audit of Intrauterine Fetal Resuscitation measures at the Ayrshire Maternity Unit (AMU)

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Introduction

Intrauterine resuscitation involves the application of specific measures to a mother in active labour with the intention of improving oxygen delivery to the compromised fetus.[1]. These measures include; full left lateral tilt, high flow oxygen, 1000ml crystalloid fluid bolus, discontinuation of syntocinon, tocolysis and the use of Vasopressors if maternal hypotension is evident.

The goals of intrauterine resuscitation are to;

- Optimize the fetal condition *in utero*, so that labour may continue safely for normal delivery.
- Improve fetal well-being prior to emergency operative delivery.
- Buy time to allow for a regional technique rather than general anaesthesia for caesarean section.
- Help stabilise a labouring women with fetal distress during transfer to hospital.

The Obstetric Association of Anaesthetists has published several hospital intrauterine resuscitations guidelines on their website.[2]

There is currently no guideline on the use of intrauterine resuscitation measures at the Ayrshire maternity unit. This Audit investigated the frequency in which intrauterine resuscitation measures where applied when evidence of fetal compromise existed at the AMU, with the aim to produce a simple departmental guideline on their application.

Methods

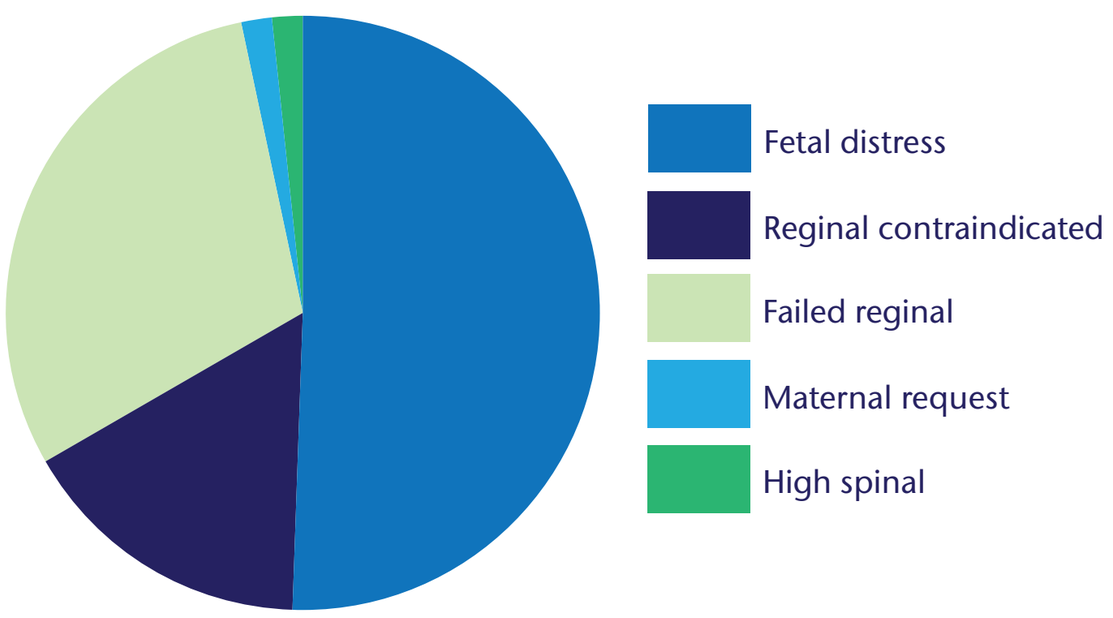
All Caesarean Sections performed under General Anaesthetic between January and November 2013 were retrospectively analysed. The indication for general anaesthetic was documented and analysed. Those Caesarean Sections undertaken due to fetal compromise (Category 1) were reviewed and evidence of intrauterine resuscitation documented. Time from decision for Caesarean Section to knife to skin and baby apgar scores at time 1 and 5 minutes were also documented. A comparison of these values made between patients who received at least 1 Intrauterine resuscitation measure and those that did not receive any.

Results

Seventy-nine caesarean sections were preformed under general anaesthetic at the AMU between January and November 2013 . Of these, information was collected on 63 patients. Thirty-two were classified as a Category 1 caesarean sections and had evidence of fetal distress on either CTG monitoring or fetal blood sampling prior to delivery.

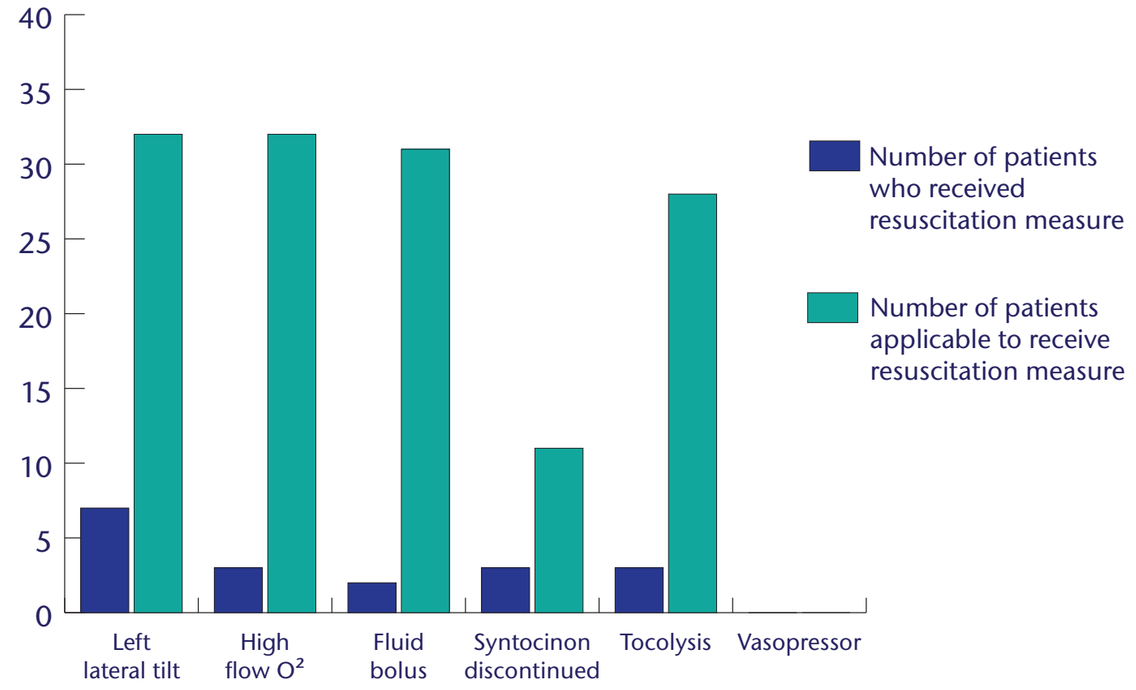
Table 1. Indication for Caesarean section under General Anaesthetic.

Indication for caesarean section under General anaesthetic		Number
Evidence of Fetal Distress on CTG +/- fetal acidosis on FBS	Total Cause unknown Major Anterior placenta previa Uterine rupture Cord prolapse	32 22 6 3 1
Regional Contraindicated	Total Back Injury Spina Bifida Sepsis Pre-eclampsia thrombocytopenia Major Haemorrhage	10 1 1 3 3 2
Failed regional	Total Failed epidural Top-up Failed Spinal	19 10 9
Maternal request	Total	1
High Spinal	Total	1



Graph 1. Indication for Caesarean section Under General Anaesthetic

Of the 32 Catergory 1 caesarean sections, 6 patients had a position change to full left lateral tilt and 3 patients received high flow oxygen. Only 2 from the 31 patients applicable to receive fluids (one patient was fluid restricted due to severe pre-eclampsia) were administered a 1000ml crystalloid fluid bolus. Ten of the 32 patients were on a syntocinon infusion but only 3 patients had the infusion stopped when fetal distress became evident. Twenty-seven patients had potential evidence of uterine hyperstimulation but only 3 received tocolysis. No patients were hypotensive therefore appropriately none were administered a Vasopressor.



Graph 2. Number of intrauterine measures delivered compared to those applicable to receive the specific measures.

Mean knife to skin time (minutes) for patients receiving no intrauterine resuscitation measures compared to those who had 1 or more intrauterine resuscitation measures instigated were 19.1 and 14.4 respectively. Baby APGAR scores at 1 and 5 minutes in the no resuscitation group were 6.5 and 8.5 respectively. This compared to those who received one or more measures whose APGAR scores at 1 and 5 minutes were 7.1 and 8.8 respectively.

Table 2. Mean knife to skin times (mins) and baby APGAR scores in the intrauterine resuscitation and non resuscitation groups.

Intrauterine resuscitation measure	Mean Knife to skin time minutes (SD)	Baby APGAR scores at 1 minute (SD)	Baby APGAR scores at 5 minutes (SD)
None	19.1 (8.79)	6.5 (1.82)	8.5 (0.89)
One or more	14.4 (7.54)	7.1 (1.95)	8.8 (1.54)

Discussion

There are no current guidelines on the use of intrauterine resuscitation for fetal compromise at the Ayrshire Maternity Unit. As a result, these manoeuvres are not routinely practiced. Evidence suggests these simple measures can improve fetal oxygen saturations[3] and in some circumstances may prevent the need for a "crash GA section". They may also buy time to stabilise both mother and fetus and allow for a regional technique to be employed reducing the risks associated with emergency caesarean section under general anaesthetic.

Concerns with the use of intrauterine resuscitation include delays in getting the patient to theatre whilst resuscitation measures are instigated. This audit demonstrated that knife to skin times do not appear to be increased when resuscitation measures are delivered as part of the preparing the patient for theatre.

As a result of this audit, a new guideline outlining how to perform intrauterine resuscitation has been produced for the Ayrshire Maternity Unit and the implementation of these manoeuvres will be prospectively audited in the future.

Appendix 1. Intrauterine resuscitation guideline for AMU

Intrauterine resuscitation guideline for AMU

Intrauterine resuscitation is appropriate when there are signs of fetal compromise including pathological CTG trace +/- Fetal acidosis on blood gas analysis.
Intrauterine resuscitation measures may help to improve fetal oxygenation and can be instigated whilst preparing the patient for theatre. They can, **in some circumstances** allow time for epidural top-up or spinal to be inserted for Caesarean section.

PILOTS APPROACH

Pressure - Ephedrine 3-6mg bolus if systolic <90mmHg

Intravenous fluids - 1 litre Hartmanns rapid infusion (unless fluid restricted as in pre-eclampsia)

Left lateral position - Remain in this position for transfer and on operating table. Consider knee to elbow position if suspicion of cord prolapse

Oxygen - 10-15litres via a tight fitting Hudsen mask. Discontinue on delivery of foetus

Tocolysis - Terbutaline 0.25mg S/C or 2 puffs GTN S/L. Be prepared for increased bleeding from the relaxed uterus. Warn Obstetrician and consider Sytocinon infusion post delivery.

Syntocinon off.

Transfer patient and restart electronic monitoring immediately once in theatre.

References

1. Velayudhareddy S, Kirankumar H. Management of foetal asphyxia by intrauterine foetal resuscitation. Indian Journal of Anaesthesia. 2010 Sep-Oct; 54(5): 394–399.
2. http://www.oaa-anaes.ac.uk/content.asp?ContentID=427
3. Simpson KR, James DC. Efficacy of intrauterine resuscitation techniques in improving fetal oxygen status during labor. Obstet Gynecol 2005; 105: 1362-1368.

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Conflicting interests: None declared