

# FOCUS ON RESEARCH

## THE DEVELOPMENT, FABRICATION AND CLINICAL EVALUATION OF A NOVEL ULTRASOUND PROBE TO GUIDE THE INSERTION OF CENTRAL REGIONAL ANAESTHESIA IN OBESE WOMEN UNDERGOING ELECTIVE CAESAREAN SECTION

### Researchers

Dr Malcolm John Watson

**Aim** The development, fabrication and clinical study of a novel ultrasound probe to guide the insertion of epidural and spinal anaesthesia in obese women undergoing elective caesarean section.

### Project Outline/Methodology

1. In order to design and build a novel ultrasound probe to guide insertion of spinal and epidural needles the key design changes to traditional ultrasound probes were:

- (i) The inclusion of a channel and epidural needle guide into the ultrasound transducer probe.
- (ii) The determination of the optimal ultrasound probe design.
- (iii) The mechanical design to adapt the probe to withstand use within the labour wards and operating theatre.

We then tested the ability of the novel probe to image the lower part of the spine to ensure that the images produced were comparable with commercially available ultrasound probes.

2. A clinical study was conducted looking at the time taken to insert an epidural catheter for combined spinal epidural anaesthesia in obese women scheduled for elective caesarean section. Two methods of guiding the epidural needles were compared; the novel ultrasound transducer and feeling the bones of the back. 42 patients were recruited from six maternity hospitals in west central Scotland over a two year period.

### Key Results

Ultrasound guided epidural and spinal anaesthesia using the novel ultrasound probe was associated with a short learning curve of only 14 procedures. In those patients recruited after the learning curve the ultrasound probe reduced the average time taken to administer combined spinal epidural anaesthesia in morbidly obese patients by approximately 20% although this trend was not statistically significant.

### Conclusions

The clinical trial demonstrated that use of the novel ultrasound probe had a short learning curve and potential time savings in the administration of spinal anaesthesia to obese patients.

### What does this study add to the field?

Sign IPG249 '*Ultrasound-guided catheterisation of the epidural space*' published January 2008 recommended that ultrasound may be helpful in identifying the epidural space in children, obese patients or in those with spinal deformity. The currently available technology make implementation of IPG249 difficult however this probe has been designed to be optimally configured to image the spine quickly, have a short learning curve and allow precise guidance of the needle into the epidural space.

### Implications for Practice or Policy

The use of ultrasound to guide the insertion of epidural or spinal anaesthesia should be considered in all obese pregnant women as ultrasound technology has the potential to

1. reduce the time taken to provide anaesthesia for operative delivery of the foetus.
2. increase patient safety due to reduced number of high risk general anaesthetics given
3. improve neonatal outcomes due to rapid provision of safe, accurate epidural and spinal anaesthesia to allow the delivery of any foetus showing signs of distress.
4. increased material satisfaction due to a reduction in the time and number of attempts taken to provide analgesia or regional anaesthesia during child birth

### Where to next?

A multi centre, multiuser clinical trial to confirm the benefits seen in this initial study

### Further details from:

Dr Malcolm J. Watson FRCA, MRCP, MB ChB, BSc  
CSO fellow and SpR in Anaesthesia  
Department of Anaesthesia, 30 Shelly Court  
Gartnavel Hospital, Glasgow  
G12 0YN  
Tel. 0141 211 2069

