

# To the Editor

I would like to thank Dr. Lamacroft on her excellent review of complications associated with regional anaesthesia for Caesarean section.<sup>1</sup>

I would like to reiterate a few practical points.

Reynolds has published a case series from the UK describing 7 cases of severe, permanent neurological deficits following spinal anaesthesia.<sup>2</sup> This report recommends the L4/5 interspace for dural puncture to minimise the risk of damage to the conus medullaris. The traditional landmark of this interspace is the intersection of the palpable line of spinous processes and the horizontal line joining the pelvic crests (Tuffier's line). Unfortunately studies by Broadbent<sup>3</sup> and Reynolds<sup>2</sup> have shown that reliance on this landmark leads to a consistent identification of lumbar interspaces one space higher than are identified radiologically. The situation is exacerbated by the fact that in 43% of females the cord ends below L2.<sup>4</sup> The implications of this work are that dural puncture should be attempted at the lowest palpable interspace and this should be below or level with Tuffier's line. More accurate localization may be possible by the use of ultrasound or screening.<sup>5</sup>

When performing dural puncture the needle should not be advanced beyond the point of CSF backflow. If spinal needles smaller than 26G are used dural penetration may be rapidly appreciated by continuous aspiration with a 2cc syringe as the needle is advanced.<sup>6</sup> Advancing the needle beyond this point increases the risk of nerve or cord penetration.<sup>7</sup>

Careful attention should be paid to sensation experienced by the patient during dural puncture. Persistent paraesthesiae, especially with worsening on injection, should alert the clinician to possible intraneural injection and the needle should be repositioned. Persistent deficits are associated with injection into the cord or conus, which may be insensitive. Injection should not be attempted without free CSF backflow and minimal resistance on injection.<sup>7</sup>

While hypotension is common after spinal anaesthesia, cardiac arrest is rare but potentially rapidly fatal. In the landmark study by Auroy in France cardiac arrest occurred in 26 of 40 640 spinal and 3 of 30 413 epidural anaesthetics with 6 deaths in the spinal group.<sup>8</sup> These results were borne out by a follow-up study.<sup>9</sup>

Cardiac arrest is a particular problem in young, fit patients with healthy cardiovascular and nervous systems<sup>10</sup> who regularly present for caesarean section (CS). This would appear to indicate a reflex mediated phenomenon. Two reflexes have been implicated:-

- The Bezold Jarisch reflex, due to feedback from mechanoreceptors in the forcefully contracting myocardium of the empty left ventricle reducing sympathetic outflow and causing bradycardia.<sup>11</sup>
- The reverse Bainbridge reflex, due to unopposed or increased parasympathetic activity in response to reduced

right atrial pressure<sup>12</sup>, which may be prevented by the administration of anticholinergic agents in high-risk parturients (heart rate < 60 prior to spinal, prolonged PR interval, age < 25 years, block above T2).<sup>13</sup>

The use of preload, ephedrine and phenylephrine for prevention and treatment of post-spinal hypotension was comprehensively covered by Lamacroft.

A rare but extremely dangerous situation is the development of hypotension and/or bradycardia associated with a decreased level of consciousness. This is an indication for urgent administration of adrenalin in boluses of 50-200 mcg (0.5-2ml of a solution of 1mg adrenalin in 10ml diluent). Auroy identified the failure to use adrenalin early after loss of consciousness due to hypotension from spinal anaesthesia as the major risk factor for poor outcome.<sup>8</sup>

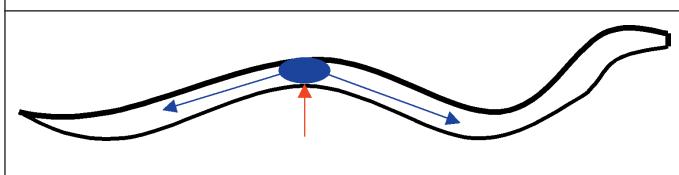
A practical method of differentiating extreme post spinal hypotension associated with subjective dyspnea from a high spinal relies on the similar innervation of biceps and diaphragm. While many parturients undergoing caesarean section under spinal anaesthesia will experience hypotension with subjective dyspnea due to intercostal and abdominal block. However, upper limb function is almost invariably maintained<sup>14</sup>, so that if the parturient is able to touch her nose with her forefinger both clinician and patient can be reassured that diaphragmatic function remains intact and the diagnosis of a high spinal may thus be excluded and aggressive vasopressor treatment continued.

Hyperbaric bupivacaine as the local anaesthetic agent of choice for caesarean section under spinal anaesthesia, as advocated by Lamacroft provides a reliable T4 block with a limited potential for extension to cervical levels if the operating table is level or up to 10° head up<sup>15</sup> and cervical flexion is maintained by at least two pillows under the head and shoulders.

Post dural puncture headache (PDPH) may be a particular problem in South Africa where small gauge or atraumatic needles may not be available due to cost issues. If only large Quincke needles are available a paramedian approach reduces PDPH as the loosely adherent arachnoid is punctured medial to the dural puncture creating an arachnoid flap that closes the dural hole.<sup>16</sup> A series of 4465 spinal anaesthetics using 20G Quincke needles by the paramedian approach was reported by Hatfalvi with no patient developing a PDPH requiring blood patching.<sup>17</sup>

Aseptic technique is essential for the performance of dural puncture. Development of an epidural abscess or meningitis is a devastating complication<sup>18</sup> that is easily preventable by simple infection control measures. These measures should be as strict as for the performance of a surgical procedure including a full scrub, gown, gloves and especially a facemask.<sup>19</sup> The use of facemasks is mandatory given a case report of three cases of post spinal infection in which the same staphylococcus was cultured from the patient and the nose of the anaesthesiologist involved.<sup>20</sup>

**Figure 1: Spread of a hyperbaric solution injected at L4/5 followed by positioning.**



Thank you for this opportunity to add to the excellent review by Dr. Lamacroft.

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