A Retrospective Study of 318 Continuous Spinal Catheters over 9 years in an Asian Tertiary Institution

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Introduction

Continuous spinal anaesthesia (CSA) is an under-utilized anaesthetic technique suitable for surgeries of the lower extremity, perineum and lower abdomen. CSA has several advantages over a single-shot spinals and epidurals¹, such as the ability to administer small, titrated and incremental doses of local anaesthetics through the catheter that may provide haemodynamic stability and the ability to achieve adequate level of dense block for indefinite duration.

Methods

Records of all patients who underwent surgery and received CSA between December 2008 and July 2017 were reviewed. Data collection source included patients' hospital electronic medical records, and anaesthesia records. We evaluated the success of the CSA and its performance details, technical difficulty (if present), initial intrathecal spinal LA volume and dose, additives to LA, subsequent intrathecal spinal top up volume, dose and frequency. We also identified the problems associated with the failed CSA cases such as failure to insert the CSA catheter or failure to complete the surgery under the CSA technique thus conversion to GA. The intraoperative haemodynamic status for the first 60 minutes after CSA was performed was evaluated and the usage of vasopressors was determined.

Results

Table 2. CSA performance

CSA Success, n (%)	
Success	318 (94)
Failed	20 (6)
Failure to insert CSA (n = 5)	
Failure to complete the operation using CSA technique which required conversion to general anaesthesia * (n = 15)	
Lumbar interspace, n (%) †	
L2/L3 / L3/L4 / L4/L5	7 (2.1) / 208 (61.4) / 91 (26.8)
Position, n (%) †	
Sitting / Lateral	38 (11.2) / 295 (87.3)
Type of CSA set, n (%) †	
Pajunk Intraloc / BBeau Tuohy Epidural	309 (91.4) / 24 (7.1)
Number of attempts, n †	
Median (IQR)	1 (1 – 2)
Initial spinal	
Volume (‡ Bupivacaine 0.5%, ml), median (IQR)	1.5 (1.0 – 2.0)
Dose (‡ Bupivacaine 0.5%, mg), median (IQR)	7.5 (5.0 – 10.0)
Additive (nil / fentanyl / morphine), n	38 / 283 / 8
Fentanyl dose, mcg, median (IQR)	10 (10 – 15)
Subsequent top up via catheter	
Total volume (Bupivacaine 0.5%, ml), median (IQR)	0.80 (0.5 – 1.1)
Total dose (Bupivacaine 0.5%, mg), median (IQR)	4.0 (2.5 – 5.5)
Successful CSA placement but no top up required	72
Frequency of top up, median (IQR)	2 (1 – 3)
Average top up volume per bolus (Bupivacaine 0.5%, ml)	0.4
Average top up dose per bolus (Bupivacaine 0.5%, mg)	2.0

94% of 318 patients successfully underwent surgery. Only 20 cases had failed CSA requiring conversion to GA. The median intrathecal LA was 1.5ml of 0.5% bupivacaine. 72 cases did not require any topup during surgery. An initial bolus of 1.5ml or more was 2.78 times more likely to have hypotension than those who have <1.5ml. The evidence was strongest in the high-risk group, OR 3.60 (95% CI 2.00 – 6.48; p < 0.001). None of the patients underwent surgery with CSA, including those in the failed CSA group experienced serious post-operative complication related to neuraxial anaesthesia. Only one patient had low back pain which resolved during the hospital stay. There were no reported PDPH, catheter breakage during removal, infection, nor any neurological sequelae like nerve injury and cauda equina syndrome.

Discussion

To ensure hemodynamic stability in patients with the CSA, it is important to administer intrathecal LA in small aliquots. The prospective UK Anaesthesia Sprint Audit of Practice (ASAP-2) study¹⁴ showed a significant correlation between hypotension, mortality and dose of intrathecal LA. That study proposed that the dose of intrathecal LA should be decreased to the lowest possible, which may potentially reduce mortality for high-risk and elderly patients. They concluded that intrathecal dose of bupivacaine 0.5% should be reduced “towards 1.5 ml”. Our study supported the use of lower spinal volume especially in fragile, elderly patient. We found none of our patients had incidence of hypotension with initial intrathecal volumes of 0.5ml and 0.8ml. A total of 20 cases (6%) had failed CSA, which 5 of them (1.5%) had failure to insert the CSA catheter (unable to thread the catheter) while others failed to complete the operation under CSA technique and required conversion to general anaesthesia. Difficulty in threading the catheter can be due to inserting the needle too far, making the catheter impossible to bend at the anterior wall of the dura mater.⁴³ One should try to slightly withdraw the needle, maintain good CSF flow and re-attempt threading the catheter. After the catheter tip leaves the needle, the catheter should be advanced only 2-3cm to avoid coiling, possible damage of the nerve roots or mal-positioning..