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Original Research

Assessment of efficacy of Continuous spinal anaesthesia

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ABSTRACT:

Background: Continuous spinal anaesthesia (CSA) is an under-utilized anaesthetic technique suitable for surgeries of the lower extremity, perineum and lower abdomen. The present study was conducted to assess efficacy of Continuous spinal anaesthesia. **Materials & Methods:** 280 cases operated under Continuous spinal anaesthesia in both genders well studied for American Society of Anesthesiologists (ASA) physical status, comorbidities, clinical outcome, details of the CSA, performance parameters, type and duration of surgery and the success of CSA. **Results:** Out of 280 patients, males were 150 and females were 130. ASA status I was seen in 140, II in 70, III in 42 and IV in 28. Comorbidities were IHD in 35, CCF in 60, diabetes in 80, hypertension in 75, CVA in 36 and CKD in 52. Discipline was vascular in 60, orthopaedics in 120, surgical in 55 and urology in 45 patients. Type of surgery was hip surgery in 40, femur in 45, lower abdomen in 80, knee in 50, foot in15 and leg in 50 cases. Duration of surgery was 105.4 minutes. CSA success was seen in 92% and failure in 8%. Failure was due to failure to insert in 6% and failure to complete the operation using CSA technique which required conversion to general anaesthesia in 2%. Position was sitting in 13% and lateral in 87%. Type of CSA was Pajunk Intralong in 90% and BBraun Tuohy Epidural in 10%. The difference was significant (P< 0.05). **Conclusion:** CSA is a useful anaesthetic technique with low failure rate.

Key words: Continuous spinal anaesthesia, Orthopaedics, Hip surgery

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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.[1,2] CSA has several advantages over a single-shot spinal anaesthesia (SSA) and continuous epidural anaesthesia (CEA), such as the ability to administer small, titrated and incremental doses of local anaesthetics (LA) through the catheter that may provide haemodynamic stability and the ability to achieve adequate level of dense block for indefinite duration.[3]

Spinal anesthesia is often preferred over general anesthesia for elderly patients with multiple comorbidities undergoing lower extremity orthopedic surgery, such as urgent repair of hip fracture.[4] Typically, these patients have an elevated risk of perioperative cardiovascular and thromboembolic complications, postoperative cognitive dysfunction, and delirium. Due to these concerns, spinal anesthesia is frequently selected over general anesthesia.

Although some evidence exists that neuraxial block with either spinal or epidural anesthesia may be advantageous in patients at high risk for adverse cardiac events, this potential advantage is not universally accepted.[5]

CSA, when compared to SSA, can be technically challenging with failure of the technique (requiring conversion to general anaesthesia [GA]), difficulty in threading the catheter especially with the microcatheters (25–32 G), catheter kinking leading to inability to aspirate or administer the LA through the catheter. CSA potentially has a higher risk of post-dural puncture headache (PDPH) due to cerebrospinal fluid (CSF) leakage through the dural puncture and the use of larger bore needle. The development of microcatheters has significantly reduced the incidence of PDPH.[6] The present study was conducted to assess efficacy of Continuous spinal anaesthesia.

MATERIALS & METHODS

The present study comprised of 280 cases operated under Continuous spinal anaesthesia in both genders. All were well informed and their written consent was obtained.

Data pertaining to patients such as name, age, gender etc. was recorded. American Society of Anesthesiologists (ASA) physical status, comorbidities, clinical outcome, details of the CSA, performance parameters, type and duration of surgery, intraoperative haemodynamic status and the usage of vasopressors were obtained. The success of CSA was defined as ability to complete the surgery with the anaesthetic technique without conversion to GA. Statistical analysis was done using Chi-square test. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of cases

Total- 280		
Gender	**Males**	**Females**
Number	150	130

Table I shows that out of 280 patients, males were 150 and females were 130.

Table II Patient characteristics

Characteristics	Parameters	Number	P value
ASA	I	140	0.01
	II	70	
	III	42	
	IV	28	
Comorbidities	IHD	35	0.12
	CCF	60	
	Diabetes	80	
	Hypertension	75	
	CVA	36	
	CKD	52	
Discipline	Vascular	60	0.05
	Orthopaedic	120	
	Surgical	55	
	Urology	45	
Type of surgery	Hip	40	0.05
	Femur	45	
	Lower abdomen	80	
	Knee	50	
	Foot	15	
	Leg	50	
Duration of surgery	Minutes	105.4	-

Table II, graph I shows that ASA status I was seen in 140, II in 70, III in 42 and IV in 28. Comorbidities were IHD in 35, CCF in 60, diabetes in 80, hypertension in 75, CVA in 36 and CKD in 52. Discipline was vascular in 60, orthopaedics in 120, surgical in 55 and urology in 45 patients. Type of surgery was hip surgery in 40, femur in 45, lower abdomen in 80, knee in 50, foot in15 and leg in 50 cases. Duration of surgery was 105.4 minutes. The difference was significant ($P < 0.05$).

Graph I Patient characteristics

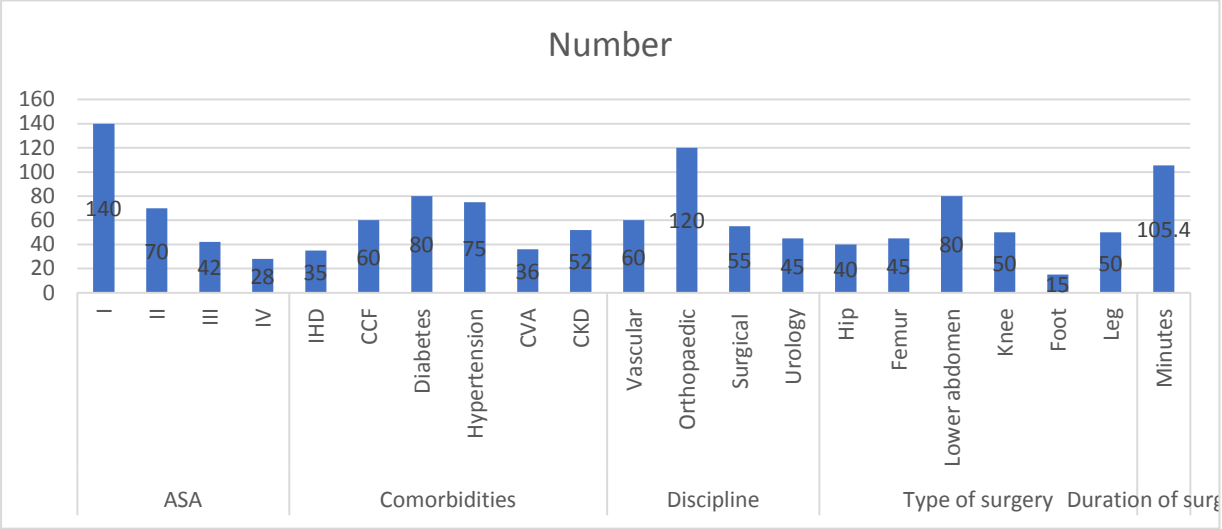

Table III Continuous spinal anaesthesia performance

Variables	Parameters	Percentage	P value
CSA	Success	92%	0.02
	Failure	8%	
	Failure to insert	6%	
	Failure to complete the operation using CSA technique which required conversion to general anaesthesia	2%	
Position	Sitting	13%	0.02
	Lateral	87%	
Type of CSA	Pajunk Intralong	90%	0.01
	BBraun Tuohy Epidural	10%	

Table III shows that CSA success was seen in 92% and failure in 8%. Failure was due to failure to insert in 6% and failure to complete the operation using CSA technique which required conversion to general anaesthesia in 2%. Position was sitting in 13% and lateral in 87%. Type of CSA was Pajunk Intralong in 90% and BBraun Tuohy Epidural in 10%. The difference was significant (P< 0.05).

DISCUSSION

CSA does not appear to be popular among anaesthesiologists as reflected by the paucity of references in the literature and it is usually reserved for fragile high-risk cases. Due to the lack of sales, one of the main manufacturers for CSA set had stopped producing Spinocath® worldwide since 2017.[7] A review of the literature has shown that CSA has been successfully used in various types of major surgeries involving high-risk patients. Examples include one patient with congestive heart failure and hypertension who underwent femoral–femoral bypass under CSA and the CSA being used in patients with severe aortic stenosis undergoing lower extremity surgery.[8] CSA may obviate the complications associated with GA and positive pressure ventilation in patients with severe respiratory problem.[9] The present study was conducted to assess efficacy of Continuous spinal anaesthesia.

In present study, out of 280 patients, males were 150 and females were 130. Beh et al[10] in their study records of all patients who underwent surgery and received CSA were reviewed. Their demographic profiles, type and duration of surgery were analysed. The outcomes measured were the success of CSA, technical evaluation and difficulties encountered, intraoperative haemodynamics, usage of vasopressors and any reported complications. Three hundred and eighteen patients (94%) successfully underwent surgery using CSA. Twenty cases (6%) had failed CSA, of which five of them had CSA insertion failure, while the rest failed to complete the operation under CSA, thus requiring conversion to general anaesthesia. Patients who have had an initial intrathecal local anaesthetic (LA) volume ≥1.5 ml had higher odds of developing hypotension compared to those who had < 0.001). There were no reported post-dural puncture headache, neurological sequelae or infection.

We found that ASA status I was seen in 140, II in 70, III in 42 and IV in 28. Comorbidities were IHD in 35, CCF in 60, diabetes in 80, hypertension in 75, CVA in 36 and CKD in 52. Discipline was vascular in 60, orthopaedics in 120, surgical in 55 and urology in 45 patients. Type of surgery was hip surgery in 40, femur in 45, lower abdomen in 80, knee in 50, foot in15 and leg in 50 cases. Duration of surgery was 105.4 minutes. Standl T et al[11] in their study one hundred patients (aged 22-86 years, mean 62.5), undergoing lower limb orthopaedic surgery, received continuous spinal anaesthesia using a 28 s.w.g. catheter inserted through a 22 s.w.g. Quincke needle. Post-operative pain relief was provided by bolus injections of 1-2.5 mL 4 h-1 of plain 0.25% bupivacaine. The mean dose of bupivacaine required for sufficient pain relief in 93% of patients was 1.6 +/- 0.2 (1.3-1.9) mL 4 h-1. The highest dose was needed between 4 and 8 h post-operatively. No dependence of dose on age or type of operation was found. Technical problems with the microcatheter occurred in 12%. The most frequent complaint was post-operative backache (12%). Only one patient suffered from post-dural puncture headache on the day after surgery. There was no microbiological contamination of the catheter tips after removal. In the post-operative interview, 89% of the patients were completely satisfied with CSA; 91% would prefer this technique to general anaesthesia.

We observed that CSA success was seen in 92% and failure in 8%. Failure was due to failure to insert in 6% and failure to complete the operation using CSA technique which required conversion to general anaesthesia in 2%. Position was sitting in 13% and lateral in 87%. Type of CSA was Pajunk Intralong in 90% and BBraun Tuohy Epidural in 10%. Deush et al[12] tried comparing the mechanical properties of microcatheters between BBraun Spinocath, Pajunk Intralong and Portex Microcatheter system and found that Spinocath 22G had the highest maximal tensile strength, which was defined as the force applied before rupture of the catheter.

CONCLUSION

Authors found that CSA is a useful anaesthetic technique with low failure rate.

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