



Anaesthesiology

A COMPARATIVE STUDY BETWEEN COMBINED SPINAL EPIDURAL ANESTHESIA AND GENERAL ANESTHESIA FOR RADICAL CYSTECTOMY AND URINARY DIVERSION OF BLADDER.

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ABSTRACT **BACKGROUND :** General anaesthesia (GA) is the most acceptable anaesthetic technique for radical cystectomy with urinary diversion . We have done this study to know whether Combined spinal epidural anaesthesia (CSE) has any advantage for this operation in respect to blood loss, haemodynamic parameters , postoperative pain control, oral intake and ambulation over GA.

METHOD : This was a prospective comparative study where 40 adult ASA-PS I and II patients of both sex were randomly allocated in GA and CSE group(n=20). Their demographic and base line parameters were comparable. GA group received standard General endotracheal anaesthesia.CSE group received first spinal bupivacaine(H) 15 mg followed by bupivacaine infusion of epidural bupivacaine .5% + fentanyl 2 mcg/ml at 6 ml/hour. Postoperatively patients of both group were sent to post Anaesthesia Care Unit.

RESULT: Intraoperative blood loss was significantly less in CSE group compared to GA. Mean Arterial Pressure (MAP), Heart Rate (HR) were significantly less most of the time during operation. VAS score for postoperative pain was better in CSE group which was statistically significant. Oral intake and ambulation was significantly earlier in the CSE group.

CONCLUSION: CSE may be considered as a safe and effective alternative to GA for radical cystectomy with urinary diversion .

KEYWORDS : Radical cystectomy with urinary diversion, General Anaesthesia, Combined spinal epidural anaesthesia, blood loss, haemodynamic, VAS

The most effective and widely used surgical intervention for muscle invasive bladder cancer (MIBC) is Radical cystectomy (RC) with pelvic lymphadenectomy.¹ In spite of improvements in surgical technique, anesthesia, and peri and postoperative management of RC, complication (27%) and mortality (0.8%) still occurs² which are mainly related to the extent of surgery, age of the patients and comorbid conditions³. General anaesthesia is widely accepted technique for this operation but it has its own side effects on cardio respiratory function, gut motility, fast tracking specially affecting the patients with comorbidity. So other options of anaesthetic techniques like spinal, epidural, CSE, are gaining popularity. Among them combined spinal epidural has some advantages like rapid onset, efficacy and safety with minimal chances of toxic effects combined with potential for improving an inadequate block and prolonging duration of analgesia intraoperatively and post operatively.⁴ Our present study was designed to compare the effects of CSE and GA in radical cystectomy with urinary diversion on different intra and postoperative outcomes with the rationality that there are very few studies on this topic and combined spinal epidural could be an effective and good alternative to GA for performing such major surgery. Our primary objective was to calculate the amount of intraoperative blood loss and secondary objectives were to observe the perioperative variations in hemodynamic parameters (HR, MABP, Oxygen saturation) to assess the postoperative pain by Visual Analogue Scale (VAS), to assess the recovery of intestinal motility by noting the time of first oral intake following surgery and to assess the time of ambulation following surgery.

METHODS

The present study was conducted in the Special Surgery O.T. Complex and Department of Urology, R.G Kar Medical College & Hospital, Kolkata during March 2016- July 2017.

After obtaining approval of institutional ethics committee & written informed consent from patients 40 adult patients of American Society Anaesthesiologist (ASA) physical status I & II of either gender, aged between 18-65 years undergoing radical cystectomy and Urinary diversion for bladder carcinoma were enrolled for the study. ASA III & IV patients, who Refused or had contraindications of spinal / epidural anaesthesia, uncontrolled hypertension and diabetes mellitus, severe pulmonary, hepatic, or cerebrovascular disease were excluded from the study. Sample size was calculated according to former study calculating sample size at α error of 0.01 and 80% power, a sample size of 13 per group was estimated. Assuming a 10% loss of follow up, a final sample size of 20 per group (n=30) was decided. The allocation of the patients was done randomly from computer generated random numbers.

All the patients received Tab. Alprazolam 0.5 mg at 10 PM at night before the day of surgery. Two intravenous line with 18 g cannula were secured and a preloading with 500ml (5-10 ml/kg) normal saline or

Ringer's lactate was done in every patient before operation. Standard monitors were attached GA was administered according to standard institutional protocol using midazolam, fentanyl, propofol and atracurium and maintained with isoflurane. After completion of surgery patients were extubated and sent to Post operative care unit. Postoperative analgesia was maintained with infusion fentanyl.

CSE was administered with needle through needle technique in sitting posture at L3-L4 level after antiseptic dressing and draping and local infiltration with 1% lignocaine Spinal anesthesia was given with 15mg of hyperbaric bupivacaine. Epidural infusion was started with 0.5 % bupivacaine and 2 mcg/ml fentanyl at a rate of 6 ml/hour. Total dose of epidural bupivacaine required to establish desired level of block, degree of motor block and duration of analgesia were noted. After surgery all the patients were sent to post anaesthesia care unit (PACU). Patients received 0.125% of bupivacaine through epidural catheter for post-operative analgesia. Hypotension (MAP < 60 mm Hg) and bradycardia (HR < 40/minute) were treated with mephentermine and atropine respectively. Sedation was provided to all patients intraoperatively with intravenous injection of midazolam. All the patients received 4-6L/minute of oxygen through a disposable face mask during the entire surgery.

Blood loss was estimated from the volume in the suction reservoir, number of blood soaked mops.

All the patients were sent to Post Anesthetic Care Unit (PACU) following surgery. Non invasive blood pressure, heart rate and respiratory rate were monitored at every 30 minutes interval. After surgery, patients were asked about their subjective assessment regarding the pre-, intra -and postoperative procedures. Pain intensity was measured using the VAS (visual analogue scale; 0=no pain to 10=very pronounced pain) at 0, 2, 4, 6, 12, 24, 36 and 48 hours after surgery.

Paracetamol infusion was given as rescue analgesic (VAS > 4) in both groups. Postoperative daily monitoring was done for the vital status and return of bowel motility and initiation of ambulation.

RESULT AND ANALYSIS:

For statistical analysis data were analyzed by SPSS 24.0. and GraphPad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. t-tests, Chi-square test or Fischer's exact test were used as appropriate. p-value ≤ 0.05 was considered for statistically significant. Age sex and baseline parameters of the patients in two groups were comparable.

Difference of mean Blood Loss in two groups which was our primary objective was statistically significant (p < 0.0001).

Table 1 blood loss

		Number	Mean	SD	Minimum	Maximum	Median	p-value
Blood	CSE	20	829.5500	69.0495	674.0000	980.0000	835.0000	<0.0001
Loss	GA	20	1075.00	156.322	880.000	1400.00	995.000	

Difference of mean HR was noted at 0,30,60,90,120,150,180, 210,240,270,300,330,360 min in two group and it was significantly less in CSE group all around except at 180 and 300 min.

Mean arterial blood pressure was noted at the same time which was significantly less in CSE group than GA except at 30,150 and 360 min. Though SpO2 was less in CSE group than GA no value reached below safe limit of 95%.

VAS (visual analogue scale) was noted immediately aftersurgery and at 2 hrs,4 hrs , 8hrs , 12 hrs, 24 hrs, 36 hrs&48 hrs aftersurgery in both the groups and it was concluded that the pain control was much better in the CSE group than GA which was statistically significant (p<0.0001).

Table 2 : Distribution ofVAS 24 in Two Groups

VAS24	GROUP		
	CSE	GA	TOTAL
0	14	0	14
Row %	100.0	0.0	100.0
Col %	70.0	0.0	35.0
1	6	0	6
Row %	100.0	0.0	100.0
Col %	30.0	0.0	15.0
4	0	4	4
Row %	0.0	100.0	100.0
Col %	0.0	20.0	10.0
5	0	12	12
Row %	0.0	100.0	100.0
Col %	0.0	60.0	30.0
6	0	4	4
Row %	0.0	100.0	100.0
Col %	0.0	20.0	10.0
TOTAL	20	20	40
Row %	50.0	50.0	100.0
Col %	100.0	100.0	100.0

Chi-square value: 40.0000; p-value: <0.0001

Association between VAS 24 hour in two groups was statistically significant.

Oral intake for the first time and time of ambulation was also studied in this study and it was found that oral intake and ambulation was statistically earlier in those patients who underwent radical cystectomy under CSE than the patients who underwent GA (p < 0.001).

Table 3 : Oral intake

ORAL INTAKE days	GROUP		
	CSE	GA	TOTAL
2nd	11	0	11
Row %	100.0	0.0	100.0
Col %	55.0	0.0	27.5
3rd	9	1	10
Row %	90.0	10.0	100.0
Col %	45.0	5.0	25.0
4th	0	16	16
Row %	0.0	100.0	100.0
Col %	0.0	80.0	40.0
5th	0	3	3
Row %	0.0	100.0	100.0
Col %	0.0	15.0	7.5
TOTAL	20	20	40
Row %	50.0	50.0	100.0
Col %	100.0	100.0	100.0

Table 4 ambulation

AMBULATION days	GROUP		
	CSE	GA	TOTAL
3rd	13	0	13
Row %	100.0	0.0	100.0
Col %	65.0	0.0	32.5
4th	7	7	14

Row %	50.0	50.0	100.0
Col %	35.0	35.0	35.0
5th	0	12	12
Row %	0.0	100.0	100.0
Col %	0.0	60.0	30.0
6th	0	1	1
Row %	0.0	100.0	100.0
Col %	0.0	5.0	2.5
TOTAL	20	20	40
Row %	50.0	50.0	100.0
Col %	100.0	100.0	100.0

DISCUSSION

Radical cystectomy with urinary diversion which is gold standard treatment for invasive bladder carcinoma is a major operation with high complication and mortality rate(0.8%).¹ GA is widely accepted anaesthetic technique for this operation but it has its own side effects specially in high risk patients for a prolonged surgery with large fluid shift. In our present study we have searched for alternative to GA comparing with CSE whether there are benefits in respect to blood loss ,haemodynamic parameters , postoperative pain, first oral intake and ambulation.

In our present study 40 patients of ASA I & II were randomly allocated in two group(CSE and GA). All the patients in both the group were age ,sex, weight compared and base line hemodynamic parameters were not significantly different. Blood loss were significantly less(p<0.001) in CSE group(829.5±69.04 ml) than GA group (1075.00 ±156.32 ml). Our study result corroborates with that of Ladjjevic N .et al ⁵ (2007) where they showed only GA has significantly more blood loss (1230± 303ml) than epidural combined with GA (880± 192 ml). Ozyuvaci et al ⁶ in 2005 published their experience that blood loss was significantly less in combined epidural and GA (EAGA) than only GA for radical cystectomy. BrankaMazul-Sunko et al ⁷ (2014) also suggested the same result indicating the induced hypotension as the cause of that. In study of O.Kofler et al⁸ (2019) comparing CSE and EAGA for open radical prostatectomy, CSE group showed significantly reduced perioperative blood loss and less fluids were infused (crystalloids and colloids) (p <0.0001) in this group than EAGA. Rodgers et.al ⁹ (2000) published a overview of 141 RCT showing neuraxial blockade significantly reduces transfusion requirements by 50%. In study of of Chengwei Liang¹⁰(2017) among 3 groups (GA, spinal+ epidural and caudal + epidural) ,both CEA and SEA were linked with a decrease in the amount of blood transfusion and analgesics required in Total hip replacement. Low blood pressure and pulse rate in CSE group may be the reason of the less blood loss in CSE group. Lower arterial pressure ,lower central venous pressure and most importantly peripheral venous pressure (PVP) reduces operative blood loss. PVP recuces the venous oozing (jan Modig 1988) .¹¹

In this study heart rate, mean blood pressure and spo2 were monitored and noted at 30 min interval upto 360 min .Most of the time MAP and PR were significantly low in CSE group due to sympathetic blockade .Different study concluded variably in this aspect. **H.hendolin etal** ¹² (1982) suggested that both the arterial systolic and diastolic pressures, and central venous pressure were significantly lower under epidural analgesia than general anaesthesia for retropubic prostatectomy.. The need for norepinephrine and the amount of atropine given were higher in the EAGA group than CSE group in the study of O.Kofler et al(2019)⁸. In study of D Bhattacharya et al ¹³(2007) ,CSE showed a significantly less incidence of hypotension (p< 0.01) along with the provision of prolonging analgesia as compared to group SA in high risk geriatric patients for major orthopaedic surgery. Priya Gupta et al ¹⁴(2002) suggested that incidence and severity of hypotension and bradycardia is similar with both the blocks CSE and epidural block in gynaecological and orthopaedic surgeries. N. Hadimioglu et al ¹⁵ in 2003 demonstrated that chance of hypotension , bradycardia were comparable in 50 patients undergoing renal transplant surgery under GA or CSE . Different degree of Sympathetic blockade may be the cause of this different haemodynamic pattern..

Though in CSE group SpO2 was significantly lower than GA group in some readings but it was not to the extent of any clinical significance. Variation in spontaneous respiration during different stages of

operation may be the cause here. M Freidrich- Fresca et al¹⁶ in 2011 concluded that CSE is an effective technique for radical cystectomy where spontaneous respiration is maintained and reduced interference of cardiopulmonary system lowers peri-operative risk specially in high risk patients.

VAS (visual analogue scale) immediately after surgery and at 2 hrs,4 hrs , 8hrs , 12 hrs, 24hrs, 36hrs&48 hrs after surgery in both the groups and it was concluded that the pain control was much better in the CSE group than GA which was statistically significant (p < 0.0001).VAS scores were calculated within 24 h after surgery to evaluate pain intensity experienced by patients. In study of Chengwei Liang¹⁰ (2017), patients in the GA group had significantly higher VAS scores than those in the CEA or SEA groups, while those in the SEA group exhibited remarkably higher VAS scores than those in the CEA group at 3 h, 6 h and 24 h after THR surgery. Ladjjevic N et al⁵ found that there was better control of postoperative pain in CEAGA than GA group significantly. Uma Srivastava et al¹⁷ (2008) conducted a study in 366 adult patients undergoing major abdominal surgery under GA or EAGA with postoperative parental analgesia or epidural analgesia, showed significantly better pain relief with less cumulative pain score in epidural group. Parental analgesic administration and VAS score were significantly less in EAGA group than only Ga group in a study in elective resection of colon and/ or rectum done by Watters JM et al¹⁵ (1993). Shir Y et al¹⁹ (1994) had similar result in a study with patients undergoing lower abdominal surgery. Continuation of analgesia via epidural catheter gave this advantage in these studies.

Time of Oral intake and ambulation was also studied in the present study which were significantly faster in CSE group than GA. Uma srivastava et al¹⁷ (2008) showed mean time of ileus was shorter CEAGA than GA but first oral intake and bowel movement was same in both groups. CSE caused early ambulation in hip surgery in the study of KC NB et al²⁰ (2011). P Wegermann and M Tryba²¹ (1999) suggested that in critically ill patients after prolonged conservative therapy if patient did not defecate spinal sympathectomy by epidural or spinal block was proved to be successful method to stimulate gut motility. Liu, Carpenter and Neal²² (1995) summarized in a review article that epidural analgesia recovers gut motility earlier in postoperative period by not only inhibiting pain pathway but also inhibiting the symoathetic supply of the GI tract. From above discussion it can be said that only epidural or EAGA may be used as alternative to GA but we have chosen CSE as it avoids side effects of GA offers rapid onset, efficacy and safety with minimal chances of toxic effects combined with potential for improving an inadequate block and prolonging duration of analgesia intraoperatively and post operatively.⁴ This technique reduces or eliminates some of the disadvantages of spinal anaesthesia while preserving their advantages.⁴

CONCLUSION :

From this study it can be concluded that combined spinal epidural anaesthesia is a good alternative of GA for radical cystectomy with urinary diversion as the amount of blood loss is significantly less in the patients of CSEA group than GA group with more haemodynamic stability. Other advantages of CSE are less chances of post operative ileus and early ambulation than GA . Post operative pain control is much better in the patients of CSEA group also. Though the study has been conducted in ASA I and II, the above findings may be helpful for the patients of ASA physical status & and there are scopes for further studies in this regard.

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