Original Research Article

Audit of epidural catheter in perioperative period in cancer patients

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Abstract

The epidural analgesia is the commonly used modality for the perioperative pain management and it has shown proven benefit particularly in dynamic pain control. This study was conducted at Gujarat cancer and research institute, Ahmedabad over period of two years from Jan 2012 to December 2014 with the permission of Institute Research Committee for guided research of hospital and after written informed consent. About 200 adult patients of cancer in whom epidural catheter was inserted were included in this study. The study was done to evaluate number of attempt for catheter insertion, number of catheter used, common problem encounter during catheter insertion and event in post operative period. There were 128 males and 72 females. The abdominal surgery patients were the largest among group that receive epidural anesthesia that is 84%. In 164 cases only one catheter and in 36 case two catheters used. In 80% of cases catheter was inserted successfully in one attempt. Most of patients required epidural catheter for more than 3 days in 95% cases. The overall incidence of complication during epidural insertion was 10%.The most common complications were dislodgement of catheter (4%), blockade of catheter (2%), bloody tap (1.5%), kinking of catheter inside epidural space (1.5%), CSF through catheter (0.5%) and discharge at insertion site (0.5%). Analgesia was given in 97% case. In other 3% case analgesia was not given because of technical or catheter related problems. In this study epidural analgesia is used as modality for the perioperative pain management and it has shown proven benefit particularly in dynamic pain control.

Key Words: Epidural anesthesia, analgesia, catheter, perioperative period.

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INTRODUCTION

The control of post operative pain is imperative for patient comfort, early mobilization and faster recovery. The term epidural (from Ancient Greek ἐπί, "on, upon" + dura mater) is a simplified and all- inclusive term often used to refer to techniques such as epidural analgesia and epidural anesthesia.[1] Epidural anesthesia is an integral part of today's practice of anesthesiology. Epidural techniques frequently involve injection of drugs through a catheter placed into the epidural space. Drugs can be administered into the epidural space will diffuse across the dura and the subarachnoid space and bind to receptors located in the substantia gelatinosa in the dorsal horn of the spinal cord. They also exert effects on the nerve roots outside the dura mater. An epidural block will also inhibit the sympathetic nervous system and the corticospinal system that controls motor functions of the body. [2]The catheter is a fine plastic tube, through which anesthetic or analgesic drug may be injected into the epidural space. Epidural catheters have a single orifice (blind end) or multi-orifice (three or more orifices) along the shaft near the distal tip of the catheter. This not only disperses the injected agents more widely around the catheter, but also reduces the incidence of catheter blockage.[3] Epidural analgesia is highly effective for management of intra-operative and post-operative pain associated with a variety of interventions in surgery. Epidural analgesia

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significantly reduces the incidence of cardiovascular events, acute respiratory failure, deep venous thrombosis and gastro- intestinal paralysis after major abdominal surgery. This may in turn reduce in-patient hospital stay, hasten recovery, and has cost savings, especially for those patients at increased risk of postoperative respiratory complications.[4] Therefore, it is important to maximize efficacy of postoperative epidural analgesia.[5] Although considered safe, several complications and problems may occur during epidural puncture and insertion of a catheter like inadvertent dural puncture, bloody tap and vascular cannulation. Further complications are technical difficulties as breakage, kinking, blockade, dislodgement and entrapment during threading or removal of catheter.[6] This study was undertaken over a period of two years. Perioperative audit of epidural catheter was taken with following aims: number of epidural catheters use for one patient, to note the complication and problem during placement and in post operative period, Fate of epidural catheter in post operative period, failure rate of epidural procedure and failure rate of post operative analgesia.

MATERIALS AND METHODS

This study was conducted at Gujarat cancer and research institute, Ahmedabad over period of two years from Jan 2012 to December 2014 with the permission of Institute Research Committee for guided research of hospital and after written informed consent. 200 adult patients of cancer in whom epidural catheter was inserted were included in this study. Patients with CNS disease and neurological deficit, coagulation disorder, spinal deformity were excluded from the study. Pre-anesthetic assessment, and haemotological, biochemical and radiological investigation were carried out. Baseline readings of heart rate, blood pressure and SpO2 were also taken. The patients were explained the whole procedure. A 20 gauge intravenous catheter was inserted on the dorsum of the hand in the other upper limb. Preloading with 15ml/kg of Ringer's Lactate was done. Pre-anesthetic medication consisting of intravenous glycopyrrolate 4µg/kg was given. The patients were placed in seating or lateral position. The level of the spine at which the catheter was placed depends mainly on the site and type of an intended operation or the anatomical origin of pain. After all aseptic and antiseptic precaution the Tuohy epidural needle was usually inserted in the midline, between the spinous processes. When using a paramedian approach, the tip of the needle passes along the lamina until just before reaching the ligamentum flavum and the epidural space. The epidural space was confirmed by loss of resistance or hanging drop method. After confirmation of epidural space, a catheter was inserted through the needle. Then the needle was withdrawn over the catheter. Generally the catheter was inserted 4–6 cm into the epidural space. The catheter was typically secured to the skin with adhesive tape or dressings to prevent it becoming dislodged.

OBSERVATIONS AND RESULTS

Total of 200 patients with ASA grade I and II undergoing elective surgery in whom epidural catheter inserted were enrolled in this study. There were 128 males and 72 females.

Table 1: Demographic Data

Parameter	Value
Age (yrs) M ± SD	49±13.4
Wt (kg) M ± SD	55±8.98
Sex (M/F)	122/78

Table 2: Type of surgery

Surgery	Number of patients
Abdominal	168
Thoracoabdominal	19
Thoracic	8
Lower limb	5

Epidural catheter was inserted for the perioperative pain management in different surgical procedures as shown in table-2. The abdominal surgery patients were the largest among group that receive epidural anesthesia that is 84%.

Table 3: Audit of epidural catheter

	1	2	3	>3
No. of Epidural catheter used	164	36	0	0
No. of attempt for catheter insertion	160	21	10	9

In 164 cases only one catheter and in 36 case two catheters used. In 80% of cases catheter was successfully inserted in one attempt.

Table 4: Number for days for which epidural use

Number of day	<3	3	4	5
Number of patients	10	146	35	9

Most of patients required epidural catheter for more than 3 days in 95% cases. The overall incidence of complication during epidural insertion was 10%.The most common complications were dislodgement of catheter (4%), blockade of catheter (2%), bloody tap (1.5%), kinking of catheter inside epidural space (1.5%), CSF through catheter (0.5%) and discharge at insertion site (0.5%).

Overall incidence of events occurred after epidural insertion in post operative period was 10%. Most common event was dislodgement of catheter and blockade of catheter. Out of 200 in 180 patients analgesia was given in other patient analgesia was not given because of intravenous cannulation, dura puncture and kinking which lead to failed epidural and catheter remove postoperatively.

Table 5: Events occurred after epidural catheter insertion during post operative period

Events	Number of patients	Percentage (%)
Blood in catheter	3	1.5
CSF catheter	1	0.5
Blockade of catheter	4	2
Kinking of catheter	3	1.5
Discharge at insertion site	1	0.5
Dressing	0	0
Dislodgement of catheter	8	4

Analgesia was given in 97% case. In other 3% case analgesia not given because of technical or catheter related problem. In one case after successful catheter placement during fixation of catheter due to accidental pulling of catheter lead to failure of procedure and then epidural anesthesia not given. In another case dural puncture occur and on aspiration of catheter CSF come, so epidural analgesia was not given. After removal of catheter CSF leak occur at insertion site, sterile tincture benzoine dressing applied but CSF continue leak, then epidural blood patch was applied and finally discharge stop.

DISCUSSION

Epidural anesthesia is an integral part of today's practice of anesthesiology. The effective use of epidural analgesia in the postoperative period requires careful assessment of the patient physiological status, pain control and associated complications. In our study 200 patients were included, mean age is 49±13.4 years, weight in kg is 55±8.98. The abdominal surgery patents were the largest group that received epidural that is 84% and other surgery that receive epidural were thoracic, thoracoabdominal and lower limb. In Faraz shafiq *et al.*,[7] study, obstetric patients were the largest among group that receive epidural that is 32. The common complications were dural tap (1.2%), ineffective pain control (2.4%) and accidental catheter pull outs (3.8%). In our study epidural catheter was continued for less than 3 days in 5%, in 73% cases continued for 3 days, in 17.5% cases continued for 4 days and in 4.5% case continued for 5 days while in other study epidural catheter was continued for 3 days in 50% case, in 33% case continued for 2 days and in 17% continued for 1 day.[7] In our study overall incidence of complications was 10% during catheter insertion. The most common complications were bloody tap, accidental dura puncture and kinking of catheter inside epidural space. The common complications were dural tap (1.2%), ineffective pain control (2.4%) and accidental catheter pull outs (3.8%) were noticed by Faraz shafiq *et al.*,[7] and 5% vascular cannulation by Kemal Tolga Saracoglu *et al.*,[8] no accidental dural puncture occurred in these stuies.[6,7,8] Katherine *et al.,*[9] in their study found that an overall failure of epidural analgesia was 12%. Common causes of neuraxial labor analgesia failure include inadequate initial epidural needle placement, suboptimal catheter sitting upon threading, catheter migration within the epidural space during labor, problematic neuraxial anatomy of the parturient, false loss-of-resistance, intravascular placement of the epidural catheter is more common in parturient. Pragnyadipta Mishra *et al.*[10] in their study found that migration of EC into intravascular, subdural and subarachnoid spaces is of common clinical occurrence with incidence showing wide variation between 21 to 43%. Hingson *et al.*, [11] found that failure of epidural anesthesia and analgesia occurs in up to 30% in clinical practice. Reasons for an inadequate epidural block include incorrect primary placement and secondary migration of a catheter after correct placement due to body movement and oscillations in CSF. Catheters may deviate from the midline during insertion. Bouman *et al.,*[6] in their study found that there was blood in the catheter after aspiration with standard catheter in 8.9% case and with the new catheter 3.2% due to inadvertent intravascular cannulation. Reasons for removal of the epidural catheter were catheter not in epidural space, dislodged catheter, obstruction or occlusion, accidental removal and kinking of catheter. An overall incidence of complication was 13.3% due to technical problems leading to early catheter removal. The most common complications were dislodgement of catheter (4%), blockade of catheter (2%), bloody tap (1.5%), kinking of catheter inside epidural space (1.5%), CSF through catheter (0.5%) and discharge at insertion site (0.5%). Analgesia was given in 97% case. In other 3% case analgesia not given because of technical or catheter related problem.

In our study no evidence suggestive of epidural infection, so epidural tip was sent for culture and sensitivity while Simpson *et al.*,[12] cultured the epidural catheter tip and stated that absence of clinically identifiable epidural space infections suggests that routine culture of epidural catheter tips is clinically irrelevant in the vast majority of cases, and that it is not a good predictor of the presence of an epidural space infection.

CONCLUSION

In this study epidural analgesia is used as modality for the perioperative pain management and it has shown proven benefit particularly in dynamic pain control.

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