

A CLINICAL STUDY OF CAUDAL EPIDURAL ANAESTHESIA FOR TRANSURETHRAL RESECTION OF PROSTATESatyendra S. Yadav¹, Suman Gupta², B. Choudhary³**HOW TO CITE THIS ARTICLE:**

Satyendra S. Yadav, Suman Gupta, B. Choudhary. "A Clinical Study of Caudal Epidural Anaesthesia for Transurethral Resection of Prostate". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 59, July 23; Page: 10309-10320, DOI:10.14260/jemds/2015/1485

ABSTRACT: In the Urological surgery, the most commonly performed procedure in Transurethral Resection of Prostate. Most of these patients are elderly above the age of 60 years with various systemic problems. The common problem includes cardiovascular disorder, chronic obstructive pulmonary diseases and various old age problems. These patients present as a challenge to anaesthesiologists because they are high risk patients for endoscopic surgeries. Various worker since many years tried different type of anesthesia procedure. The regional techniques have been proved to be safe and less risky. It includes spinal, lumbar epidural, combined spinal epidural and caudal epidural. The caudal epidural block have been used by many workers for TURP in elderly patients since so many years. The Present study includes 50 patients of ASA grade I, II, III including cardiovascular problem, COPD, and other spinal deformities, scheduled for TURP. After pre anesthetic checkup and through investigation, caudal epidural block were given by standard technique. Observation and results were recorded by observing the onset and duration of analgesia, level of block, any side effects. The changes in pulse rate, blood pressure, SPO₂, ECG were closely monitored throughout the procedure. The observation showed that 60% of patients having co-existing diseases and most of them having chronic Hypertension (30%), onset of analgesia was 10-15 mins in 30 patients. Motor blockade by modified bromage scale was observed and found that 45 patients (90%) has MBS-O. There were no significant changes observed in PR, BP, R/R, ECG and SPO₂ throughout the procedure in all patients. Response to total procedure was found excellent in 40 patients (80%). There were no significant complication observed in maximum number of patients. Only 5 patients had complained of nausea and vomiting, which was successfully treated by antiemetics.

KEYWORDS: Caudal epidural block, Transurethral Resection of Prostate, Bupivacaine, Lignocaine with adrenaline, Elderly patients.

INTRODUCTION: The International Association for the Study of Pain defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage¹, or described in terms of such damage".

Acute pain is the term described to pain associated with brief episode of time injury or inflammation, such as that carried by surgery burns, trauma or even medical disease.

Effective pain control is executed for optimal care of the surgical patients and in this field of human endeavor who can rank higher than the Anesthesiologists –as a "The Perioperative Physician" Trans urethral resection of prostate (TURP) is one the most commonly performed urological procedure in men older than 60 year of age.

The operation is performed through a modified cystoscope and consists of excising the hypertrophized lateral and median lobes of prostate gland with an electrically energized wire loop, bleeding is controlled with a coagulating current. Continuous irrigation is used to distend the bladder and to wash away blood and dissected prostate tissue.²

ORIGINAL ARTICLE

Bleeding and coagulopathy is the common problem of TURP due to highly vascular prostatic tissue and large venous sinuses. Another relatively common complication of TURP is perforation of the bladder³. Most perforation are extra peritoneal and in the conscious patient they result pain in the periumbilical, inguinal or suprapubic region.

Another relatively uncommon problem faced in TURP is TURP syndrome.

TURP syndrome is a term applied to a constellation of symptoms and signs caused primarily by excessive absorption of the irrigating fluids in to the general circulation through the open veins. If water has been used, severe hemolysis with acute renal failure can occur.³ even isotonic fluids like glycine may cause problems by expanding the blood volume which causes hypertension and reduces electrolyte concentration with resultant neuromuscular disturbances such as convulsions and temporary paralysis.⁴

Many anaesthetic techniques has been proposed for the TURP like general anaesthesia with cuffed endotracheal intubation. Regional anaesthetic technique like spinal anesthesia, combined spinal epidural anesthesia, continuous epidural anesthesia, and local anesthesia etc.⁵

Regional Anaesthetic Techniques Usually Preferred for TURP over General Anesthesia.

Because of:

- Maintenance of consciousness permits prompt recognition of cerebral and cardiac dysfunction, TURP syndrome etc.
- Amelioration of endocrine response to surgery.

Problem of Spinal, Combined Spinal - epidural Continuous Epidural Anesthesia are:

- Hypotension.
- Respiratory impairment.
- Post dural puncture headache.
- Backache.

Caudal Epidural Anesthesia can be a Suitable Alternative, Because of:

- Marked hemodynamic stability.
- Minimal incidence of respiratory impairment.
- Negligible chances of dural puncture.

Caudal epidural anesthesia first described by Cathelin and Sicard in Paris in 1901.⁶ At first they attempted to produce block of spinal nerves that would improve on spinal analgesia in laboratory animals. After experiments in cadavers, they adapted the technique for therapeutic purposes in the control of enuresis.

MATERIAL: The study included 50 patients of 50-80 years of age of ASA grade I, II & III including cardiac diseases, chronic hypertension, COPD and spinal deformities, scheduled for TURP. Patient with local infection at sacral region, sacrovertebral anomaly, coagulation disorders, failed caudal blockade were excluded for the study. A routine pre-anaesthetic checkup was done. All routine and special investigations were performed.

METHODS: With the approval of Hospital ethics Committee and informed consent of the patient, Patients were assured pre-operatively. The pulse rate, blood pressure and respiratory rate were recorded just before surgery.

ORIGINAL ARTICLE

All patients were premedicated with glycopyrrolate (0.01 mg/kg).

The patient was placed in left lateral position. The landmark was the two sacral cornua, located by the palpation at the caudal extremity of the vertebral spinous process line, these delimits a triangular zone at the centre of which the block needle was inserted. After painting and drapping a skin wheal is raised over the hiatus and the subcutaneous tissue infiltrated with a small quantity of local anesthetic. The needle was inserted at right angle to the skin until and unless it pierced the sacrococcygeal ligament. The needle was then redirected rostrally at a 45° angle to the skin and advanced until the dorsal aspect of the ventral plate of the sacrum was contacted. The needle was then withdraw slightly and redirected so that the angle of insertion relative to the skin surface is decreased, the angle was almost parallel to the tabletop.

During the redirection of the needle and following loss of resistance, the needle was advanced approximately 1 to 2cm into the sacral canal.

The correct placement of the needle into the sacral canal was tested by loss of resistance technique. After the aspiration test, 5 ml lignocaine with adrenaline was given as a test dose. If there was no evidence of spinal or vascular puncture in a few minutes, than lignocaine with adrenaline 1% 20 ml and bupivacaine 0.5% 10 ml (Total volume 30 ml) was given through block needle.

After injection patient made supine.

All patients were assessed for onset and level of block by pinprick method, duration of analgesia, and motor blockade by modified bromage scale:

Modified bromage scale.

- 0 No motor paralysis.
- 1 Inability to raise the extended leg.
- 2 Inability to flex the knee.
- 3 Inability to flex the ankle joint.

Monitoring: Patients were monitored for pulse rate, blood pressure, and respiratory rate ECG and SPO₂ continuously throughout surgery by using Hewlett Packard Multichannel monitor.

OBSERVATIONS:

Sl. No.	No. of patient	Duration (in mins.)
1.	28	40.2
2.	10	45.8
3.	8	50.2
4.	4	58.6

Table 1 : Duration Of TURP

This table shows duration of TURP surgeries. In all patients duration of TURP was in between 40 mins to 60 mins.

ORIGINAL ARTICLE

Co-existing Diseases	No. of Patient	Percentage
Chronic hypertension	15	30
History of MI	5	10
COPD	8	16
Spinal deformities	2	4

Table 2: Co-existing disease with study group patients

This table shows, that 60% patients having co-existing diseases, and most of them having chronic hypertension (30%).

Sl. No.	Time (min.)	No. of Patient	Percentage
1.	0-5	None	-
2.	5-10	10	20%
3.	10-15	30	60%
4.	15-20	4	8%
5.	20-25	6	12%

Table 3: Onset of Analgesia

The above observation shows that maximum number of patients i.e. 60% had onset of analgesia between 10-15 mins, while only 12% patients had onset of analgesia between 20-25 mins.

Sl. No.	Duration (mean)	No. of patient	Percentage
1.	190.6 min	30	60%
2.	180.2 min	8	16%
3.	176.4 min	6	12%
4.	172.1 min	4	8%
5.	170.8 min	2	4%

Table 4: Duration of Analgesia

The above table shows that, in 60% of patients duration of analgesia was more than 3 hours. In 40% of patients, it was between 2-3 hrs. Only 2 patients had complained of feeling pain after 2½ hrs.

Sl. No.	Motor blockade	No. of patient	Percentage
1.	0	45	90%
2.	1	5	10%
3.	2	Nil	-
4.	3	Nil	-

Table 5: Motor Blockade (By modified bromage scale)

This table shows that, in majority of patients i.e. 90% had no motor paralysis (it was 0 on MBS), only 5 patients had partial motor paralysis. It was 1 on MBS.

ORIGINAL ARTICLE

Sl. No.	SPO ₂ (mean) %	No. of patient	Percentage
1.	99.8	18	36%
2.	99.2	12	24%
3.	98.6	10	20%
4.	94.2	6	12%
5.	90.4	7	8%

Table 6: Changes in O₂ saturation

This observation shows that all patients had SPO₂ between 90-100% throughout the procedure.

Sl. No.	Time of observation (mins)	Respiratory rate (mean)
1.	0	12.6
2.	5	13.2
3.	10	13.6
4.	15	12.8
5.	20	12.1
6.	25	13.8
7.	30	14.2
8.	35	12.4
9.	40	12.5
10.	45	12.6
11.	50	13.4
12.	55	12.2
13.	60	12.7

Table 7: Showing variation in the respiratory rate

This observation shows that, there were very less fluctuation in RR throughout the procedure at 5 min interval in all patients. In all patients RR were with in normal limit i.e. 12-15 breaths/min. At no time the mean R.R. was more than 15 breaths/min.

Sl. No	Time of Observation (mins)	Pulse Rate (mean)
1.	0	80.3
2.	5	80.4
3.	10	81.6
4.	15	82.4

ORIGINAL ARTICLE

5.	20	84.1
6.	25	80.2
7.	30	80.4
8.	35	82.4
9.	40	83.6
10.	45	84.6
11.	50	81.4
12.	55	80.6
13.	60	80.2

Table 8: Showing variation in the pulse rate

The variation in pulse rate after the caudal block is shown in above table. This observation shows that, in all patients mean pulse rate were between 80-85 beats/min throughout the procedure and there were very less fluctuation in pulse rate at 5 min interval.

Sl. No.	Time of Observation (Mins.)	SBP (mmHg) (mean)
1.	0	120.6
2.	5	120.8
3.	10	120.2
4.	15	120.4
5.	20	121.3
6.	25	124.6
7.	30	122.6
8.	35	123.2
9.	40	121.8
10.	45	123.5
11.	50	123.8
12.	55	124.6
13.	60	126.8

Table 9: Change in systolic blood pressure

This table shows that, in all patients, there were very less fluctuation in systolic blood pressure in 5 min intervals throughout the procedure. It was between (120-128 mmHg) in all patients

Sl. No.	Time of observation (mins)	DBP (mmHg) (mean)
1.	0	84.2
2.	5	83.6

ORIGINAL ARTICLE

3.	10	83.4
4.	15	83.8
5.	20	80.6
6.	25	80.5
7.	30	80.2
8.	35	81.4
9.	40	81.8
10.	45	82.6
11.	50	82.8
12.	55	82.6
13.	60	82.5

Table 10: Changes in Diastolic blood pressure

This table shows that, in all patients, there were very less fluctuation in diastolic blood pressure in 5 min intervals throughout the procedure. It was between (80-85 mmHg) in all patients.

1.	Nausea/Vomiting	5
2.	Urinary Retention	0
3.	Dural puncture	0
4.	Hypotension	0
5.	Respiratory depression	0

Table 11: Showing complication/side effect

The above table shows that, only 5 patients had complained of Nausea/vomiting, and there were no other significant side effect in all patients.

Sl. No.	Response in Patient	No. of cases	Percentage
1.	Excellent	40	80
2.	Good	8	16
3.	Fair	2	4
4.	Poor	0	0

Table 12: Showing response to total procedure

The above data shows that in our study of 50 patients. Successful Caudal Epidural Anaesthesia in patients were excellent in 80% of patients and fair in only 4% of patients.

DISCUSSION: The regional anaesthetic technique have been used since ancient Egypt's, but they were given up later till the beginning of the 20th century⁷. There has been dramatic change in the use of regional anaesthetic technique in the treatment of pain in early 70's.

ORIGINAL ARTICLE

The reasons of increasing popularity of regional anesthetic technique are several. The local anaesthetics and techniques today are safer than those in the past and their pharmacologic effects has been well evaluated.⁸

The use of regional anaesthesia considerably reduces the cost of the patient care and financial burden.

Bupivacaine was synthesized by Ehenstam and his colleagues in 1957, plays an important role in the treatment of post-operative pain because it is a long acting local anaesthetic when given in recommended doses.⁹ it produces prolong, profound and safe analgesia.

A well conducted regional anaesthetic technique is a thing of beauty and gives satisfaction and comfort to patient, anesthesiologist and surgeons. Regional anaesthesia preserves consciousness, and patient protective reflexes. Block procedures have also been advocated as a means of avoiding the morbidity and mortality associated with G.A. The lower cost of regional anaesthesia can be a considerable advantage. Block technique are simple to perform without any polypharmacy and reduces the physiological stress of the surgery as compared to G. A.¹⁰

Caudal block is not a new technique. Most of the studies are between 1901-1969. Zito SJ (1984)¹¹ reviewed this technique and concluded that caudal epidural has distinct advantage over spinal/lumbar epidural for lower abdominal, Urological surgeries.

I have attempted the same in my study with 50 elderly patients of 52-80 years of age belonging to ASA grade I, II, III including those with history of MI, chronic hypertension, COPD and spinal deformities, scheduled for TURP.

To know the efficacy and safety of caudal epidural block, to observe the onset of analgesia, duration of analgesia, motor blockade, effect on the respiratory system, effect on the hemodynamics and side effects/complications.

In this study, patient with sacral vertebral anomaly, localized sepsis, coagulation disorders were excluded.¹²

Robert Turner had concluded that caudal epidural technique can provide rapid onset of anaesthesia without cardiovascular disturbances.

In our study onset of analgesia was 10-15 min in 60% of patients and 5-10mins in 20% of patients out of 50 patients. It indicates that onset of analgesia was rapid in caudal epidural block.

Linda T. O. Roce Marry Ann in their 150 cases found that duration of analgesia produced by bupivacaine alone was 240 mins.

In our study we have used bupivacaine 0.5% 10 ml and lignocaine 1% with adrenaline 20 ml (total 30 ml) and observed that duration of block was between 170-195 mins and quality of sensory block was excellent in majority of cases.

Siegel Y, Ezra S, Eting A et al (1989)¹³ has conducted 28 resection of benign prostate hypertrophy and concluded that average time for the surgery was 69 mins.

In our study, we have also found that duration for TURP was between 45 to 60 min.

In our study we have used bupivacaine 0.5% 10 ml and lignocaine 20 ml 1% with adrenalin (total volume 30 ml).¹⁴ We found that majority of patients had no motor paralysis.

Southworth JL and Hingson RA¹⁵ suggested that 30 ml of drug is sufficient for upto T10 segments and at this drug dosage there is no respiratory disturbances.

In our study found that analgesia at the level upto T10. We also observed that in all cases SPO₂ were maintained 90-100% and there were very minimal changes in respiratory rate at 5 min interval throughout the surgery in all patients.

ORIGINAL ARTICLE

Danielli L, Linder A et al studied caudal anaesthesia for TURP. They described caudal anaesthesia is a safe and effective procedure which they have used in 28 resection of benign prostate hypertrophy. The emergence time for resection was 49 mins. Recovery from the anaesthesia average 78 mins. In 44.3% of the patients there were no need for other medication during operation. They concluded that in all patients, hemodynamic changes were minimal and controlled by fluid replacement in a third of the patients. The success rate was 77.1%, failure were due to technical difficulties.

In our study, we have taken 50 patients aged between 50-80 years. The total time for TURP upto 60 min and more than 50% cases had done within 45min.

We have observed pulse rate 5 min interval and found that there were insignificant changes in pulse rate in all patients and it was between 80-85 beats/min. We have also monitored SBP and DBP throughout the procedure at 5 min interval and found that there were very less fluctuations in SBP as well as DBP throughout the procedure in all patients. SBP was maintained between 120-128mmHg and DBP was maintained between 80-85mmHg. It suggest that all patients in my study were haemodynamically stable throughout the procedure.

In our study we have excluded the patient who had local infection at the site of injection, coagulation disorders, sacrovertebral anomaly we have given caudal block in 50 patients and found that failure rate of caudal block was nil.

Dr. Bela Vadodaria et al¹⁶ described that caudal anesthesia is the easiest and safest approaches to the epidural space. When correctly performed there is a little danger of either the spinal or dura being punctured.

Rostomechvili et al (1991)¹⁷ had studied caudal epidural anaesthesia for surgical interventions for varicose disease of lower extremities. They concluded this method of anaesthesia was proved to be adequate, technically simple and harmless to the patients.

In our study of 50 patients we also did not observe any case of dural puncture/spinal injury and other complications like hypotension, hypertension, respiratory depression we had observed 5 patient had complained of nausea which was successfully treated by antiemetics.

In our study we found response to total procedure were excellent in 80% of cases and fair only in 4% of cases which indicates that this method is technically simple, adequate and harmless to the patients.

CONCLUSION: Elderly patients for TURP always present a challenge to anesthesiologist. If demands a safe, smooth and simple technique of anesthesia. In our study we performed the TURP under caudal epidural anesthesia. Inj. Bupivacaine 0.5% 10ml and lignocaine with adrenaline 1% 20ml was given through caudal epidural route to all the patients. Lignocaine with adrenaline 1% has longer duration of action. Both the drugs causes insignificant changes in the vital parameters. Incidence of side effect are minimal and insignificant.

Thus we concluded, that caudal epidural anaesthesia for TURP in old age group patients is a safe, smooth and effective alternative technique with insignificant complications.

BIBLIOGRAPHY:

1. The International association for the study of pain defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage”.

ORIGINAL ARTICLE

2. Tausin FP, Sans L: Prostate transurethral resection syndrome. *Ann. Fr. Anaesth. Reanim.* 1992;11(2):168-9.
3. Tausin FP, Sans L: Prostate transurethral resection syndrome. *Ann. Fr. Anaesth. Reanim.* 1992;11(2):168-9.
4. Coppinger SW, Lewis CA, Milroy Ej: A method of measuring fluid balance during transurethral resection of the prostate. *Br. J. Urol.* 1995; 76(1): 66-72.
5. Zito SJ: Adult caudal anesthesia: a reexamination of the technique: *Anesthesiol* Jan-Feb.41 (1) 30-2-1994.
6. Eting A: Transurethral procedures with cadul anesthesia.
7. Adamsn R.C., Lundy J. S., Seldon T.H.: Continuous caudal anaeshtesia or analgesia: A consideration of the technique, various uses and some possible dangers - *J.A.M.A.* 122:152, 1943.
8. Adriani, J. (1954) *Nerve blocks. A manual of regional anaesthesia for practitioners of medicine.* Springfield, I.L., Charles, C. Thomas.
9. Bela Vadodaria: *Caudal epidural Anaesthesia; Royal Devon, Exeter.* Issue 8, 1998.
10. Govino, B.G., (1980) Mechanism of action of local anesthetic agents. *Topical rev. anesthesiology.* 1:85, Edited by Norman, J. and Whitwam, J.
11. Collins V.J. and Robin P. A. Roengenological study of the male sacrum as an aid in caudal analgesia. *Anaesthesiology.* 6:505, 1945.
12. Dubrovin VN: Caudal anesthesia in transurethral resection of the prostate.
13. Eting A: Transurethral procedures with caudal aneshtesia.
14. Mayao Gancia D: Caudal block with 0.25% bupivacaine in children undergoing surgical correction of congenital pyloric stenosis, Sep.-Dec. (5-6):1992.
15. Rostommarshvili ET: Sacral epidural anesthesia in operations for varicose veins of the lower extremities: *Anesthetic intensine care* 1991 Nov 19(4):551-4.
16. Sakura S: The addition of epinephrine increases intensity of sensory block during epidural anesthesia with lidocaine. *Acta anaestheiol sin* Dec 36(4):221-7, 1998.
17. Southworth J.L. and Hingson R.A.: Continuous caudal analgesia in surgery. *Ann. Surg.* 118; 945:1942.

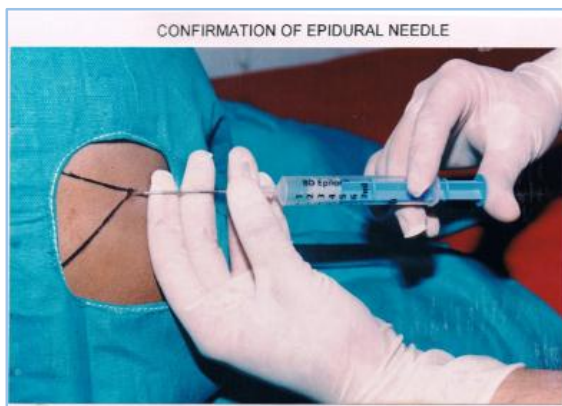


Figure 1

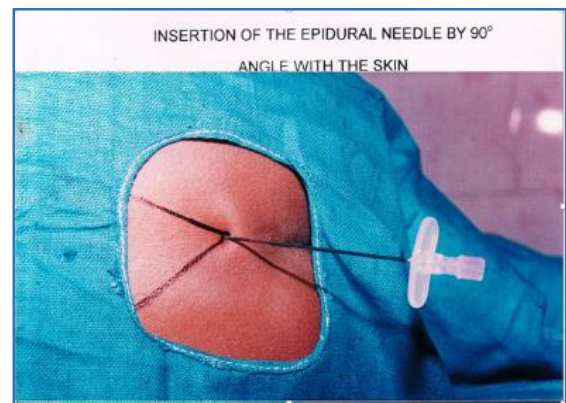


Figure 2

ORIGINAL ARTICLE

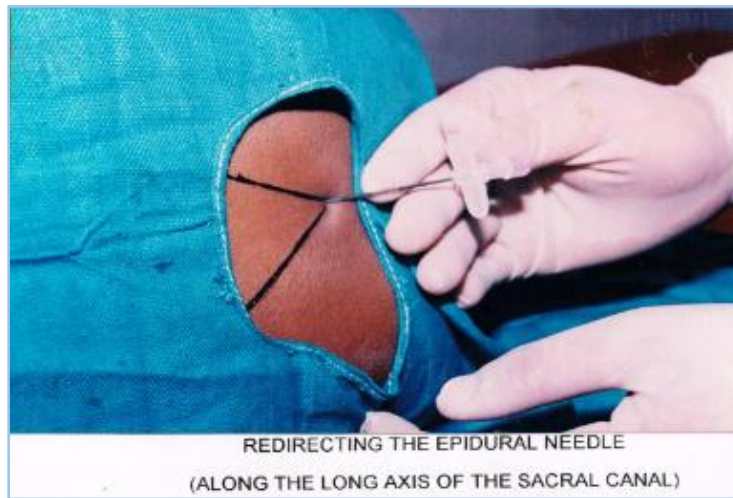


Figure 3

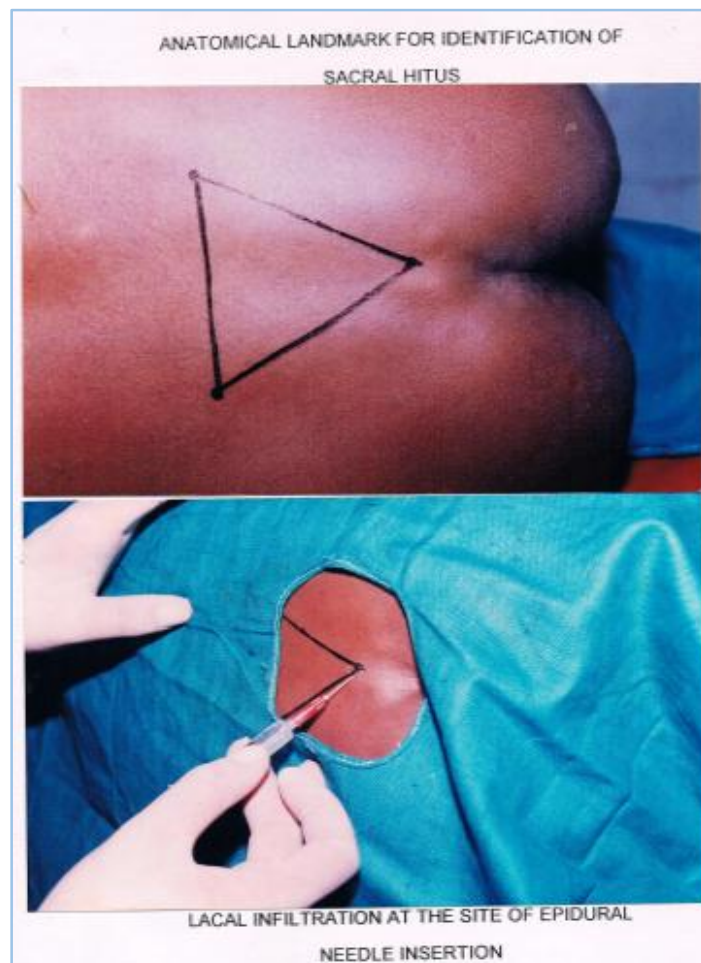


Figure 4 & 5

AUTHORS:

1. Satyendra S. Yadav
2. Suman Gupta
3. B. Choudhary.

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Anaesthesiology, J. A. Group of Hospitals, G.R. Medical College, Gwalior, Madhya Pradesh, India.
2. Assistant Professor, Department of Anaesthesiology, J. A. Group of Hospitals, G.R. Medical College, Gwalior, Madhya Pradesh, India.

FINANCIAL OR OTHER

COMPETING INTERESTS: None

3. Professor and HOD, Department of Anaesthesiology, J. A. Group of Hospitals, G.R. Medical College, Gwalior, Madhya Pradesh, India.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Satyendra S. Yadav,
Assistant Professor,
Department of Anesthesiology,
J. A. Group of Hospitals,
G. R. Medical College,
Gwalior, Madhya Pradesh, India.
E-mail: drssy_17@yahoo.com

Date of Submission: 02/06/2015.

Date of Peer Review: 03/06/2015.

Date of Acceptance: 16/07/2015.

Date of Publishing: 21/07/2015.