

# Comparative Study of Two Different Methods of Epidural Catheter Fixation: Occlusive Dressing Versus Lockit Device

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## Abstract:

**Context:** epidural block is well established procedure for effective anesthesia and post operative analgesia. The purpose of this study was to compare occlusive dressing with lockit epidural catheter clamp for securing lumbar epidural catheter and thereby prevent catheter migration.

**Aims and objective:** To compare the efficacy and appropriateness of achieving secured fixation of epidural catheter.

**Material and methods:** 100 patients of either gender between the age of 20 and 65 years was included in this study and randomized into two groups. Group A: OCCLUSIVE DRESSING for epidural catheter fixation. Group B: LOCKIT DEVICE for epidural catheter fixation. Group A received occlusive dressing while in group B epidural catheter threaded through the central eyelet of lockit device for catheter fixation.

**Result:** catheter migration was noted in 10 patients in group A whereas it was only in 2 patients in group B.

**Conclusion:** Lockit epidural device was found to be more efficacious than occlusive dressing in our study.

**Keywords:** epidural catheter, lockit device, analgesia, catheter migration

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## I. Introduction:

Epidural block is a well known mean of providing analgesia. But inadequate block may result in unsatisfactory pain relief. Catheter migration causes a greater incidence of inadequate block and unsatisfactory analgesia (Crosby). This highlights importance of catheter fixation. The purpose of this study was to compare occlusive dressing with lockit epidural catheter clamp for securing lumbar epidural catheter and thereby prevent catheter migration.

## II. Aims And Objectives:

To compare the efficacy and appropriateness of achieving secured fixation of epidural catheter.

## III. Materials And Methods:

After institutional ethical committee clearance and written informed consent from patients, 100 patients of either gender between the age of 20 and 65 years was included in this study and randomized into two groups.

Group A: OCCLUSIVE DRESSING for epidural catheter fixation

Group B: LOCKIT DEVICE for epidural catheter fixation

### Inclusion criteria

- Lower limb orthopaedic surgeries or lower abdominal surgeries
- No contraindication for neuraxial blocks
- Written consent for study
- Of either sex, age 20-65years

### Exclusion criteria:

- Patient refusal
- Neurological disabilities
- Spinal deformities
- Any allergy to the material

Patients received epidural anaesthesia in the lumbar region using midline approach after local anaesthetic infiltration. Loss of resistance to air method was used to identify epidural space. 5 to 6 cm length of

the epidural catheter had placed in the epidural space. Catheter flushed with 3ml saline to rule out kink after fixation.

following negative response to test dose of 3ml 2% lignocaine with adrenaline, 0.5% bupivacaine was given to initiate epidural anesthesia

followed by 0.125% bupivacaine with 20mcg of fentanyl for maintenance of post-operative analgesia.

Group A received occlusive dressing while in group B epidural catheter threaded through the central eyelet of lockit device for catheter fixation.

Pain scores were noted every 4 hours and a score of **more than equal to 5** on visual analog scale was treated with 50 mg intravenous tramadol. Patient's comfort during the procedure was evaluated on Likert scale (-2 to +2).

Likert scale is employed in research that employs questionnaires to measure people's attitudes, opinions or perceptions. Although not specific to assess the satisfaction of the patient during a medical intervention, it has been previously employed in anesthetic practice by Baroudi *et al.* They have validated this five-point scale with -2 to +2 as available scores to quantify the patient's satisfaction after anesthetic exposure comparing different levels of care.

Erythema, induration, inward and outward migration was noted at the time of catheter removal at 72 hours after surgery. Independent sample t test was applied to continuous variables

#### IV. Results :

110 patients were taken according to study protocol who met all inclusion criteria and posted for lower limb orthopaedic surgeries and lower abdominal surgeries. Epidural catheter was successfully placed in 100 patients and in 10 cases procedure was abandoned due to multiple attempts. Major causes of failure were obesity, non-cooperative patients, decreased interspinous space and kyphoscoliosis.

Demographic profile was comparable among the two groups (p value > 0.05) (table 1) and were found to be insignificant. On Likert scale for patient comfort during catheter fixation, majority of patients in both groups completely accepted the procedure and did not have any complaint.

In group A, 22 patients complained of inadequate analgesia after 12 hours in the postoperative ward whereas only 2 patients in group B complained of failure to control pain. The difference was statistically significant (p value < 0.01) (table 3)

Complications were noted in both groups among which catheter migration was the major event. 10 patients in group A were noted to have catheter migration (mainly pulled out) compared to only 2 patients in group B. The difference was statistically significant. Catheter migration in group A was mainly due to improper catheter holding by occlusive dressing during patient movement.

#### 1. Demographics of patients (table 1)

Parameter	occlusive dressing	lockit device	P value
Age (years)	44± 12.8	48± 16.4	>0.05
Gender(male/female)	40/60	42/58	>0.05
mean height	158.86 cms	160.32 cms	>0.05
mean weight	56.2 kgs	58.6 kgs	>0.05

Demographic profile was not significant

#### 2. Patients comfort during catheter fixation

LIKERT scale	-2 (totally unacceptable)	-1(unacceptable)	0(neutral)	+1(acceptable)	+2( completely acceptable)	P value
Group A	0	0	2	6	42	>0.05
Group B	0	0	4	6	40	>0.05

#### 3. Inadequate analgesia

Group A	12	P value
Group B	4	

#### 4. Complications noted

Erythema at site	2	3
Bleeding from the site	0	0
Catheter obstruction	1	2
<b>Catheter migration</b>	<b>10</b>	<b>2</b>
Catheter snapping and retraction	0	0

## V. Discussion:

In a study by Crosby, catheter movement was assessed in 211 patients who had an epidural catheter placed for labour analgesia. Fifty four percent of catheters migrated during labour and seventy percent of these migrated out of epidural space. Seventeen percent of the patients had unsatisfactory analgesia.

Tripathi and Pandey described a method of leaving a loop of catheter on the skin during tunneling as a way to reduce traction on the catheter and to prevent dislodgement.

Sharma A and others (2016) in a trial comparing subcutaneous tunneling with fixation device concluded that lockit device was a safe and comfortable fixation device compared to subcutaneous tunnelling of catheters.

Hermanides *et al.* have reported an incidence of 30% failure in epidural analgesia in clinical practise secondary to incorrect primary catheter placement, subsequent migration after correct initial placement and suboptimal drug dosing. Unsatisfactory pain relief due to migration of epidural catheter is a major cause of suboptimal analgesia, and secure fixation is required to prevent catheter dislodgement. The technique should also be operator friendly and comfortable to the patient.

Our study shows that patients were comfortable and receptive toward both procedure.

Burstal *et al.* have concluded in their review that tunneling (one of the method of fixation of catheter) decreases the incidence of migration but does not abolish it.

Kumar and Chambers also had similar results. They also outlined the safety concerns, catheter hygiene and daily catheter examination to avoid morbidity from the tunneling procedure, while creating the tunnel. This could have been avoided by the use of needle sheath as a stabilizer to guide the hub of needle. lock it device has been shown to be 88% successful in preventing the migration, inward as well as outward in a study by Clark *et al.*

Patients with occlusive dressing of catheters in our study showed higher incidence of poor pain scores with increased requirement of tramadol. This shows that apart from catheter migration, factors such as individual pain threshold and complexity of surgical procedure contribute toward failure of analgesia. Movement of the catheter at the skin surface does not always translate into the migration of catheter tip inside the epidural space, but does suggest that there has been a displacement of the catheter assembly.

Leaving a loop of catheter on the skin during tunneling was described by Tripathi and Pandey as a strategy to prevent dislodgement. The interposed loop is supposed to dampen the outward traction on the catheter. Their study had a high incidence (29%) of local inflammation at the site of tunneling. There is a possibility of infectious complication with the same epidural needle being used twice.

Snapping of the catheter is a serious complication with the catheter retracting inside the skin. Hobaika has outlined recommendations on the length of catheter to be left in epidural space and indications of surgical retrieval of the catheter fragment.

We experienced two catheter obstructions in group B patients. These patients were morbidly obese with overhanging gluteal fat folds and significant lumbar lordosis. This had resulted in improper contact between skin and device. The Lockit device clamp does not allow any movement of the catheter, once closed. Hence, an improper contact can kink the small portion of catheter in between the skin and the device and outward migration in 2 patients in group 2 may be due to same reason.

Our study had not significant numbers of "dislikes" for both the procedures. Two patients in group B reported a "feeling of something poking into their back" which was equivalent to a dig-in sensation in supine position.

## VI. Conclusion:

Lockit device is highly needed due to high incidence of inadequate epidural analgesia due to epidural catheter migration in patients despite the best efforts in securing the catheter with occlusive dressing. However, a patient friendly technique with no additional needle pricks, lesser incidence of erythema and bleeding complications is more appropriate. Lockit epidural device was found to be more efficacious than occlusive dressing in our study.

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