VOLUME-8, ISSUE-12, DECEMBER-2019 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Anaesthesiology

PAIN RELIEF DURING EPIDURAL NEEDLE PLACEMENT – A COMPARATIVE STUDY USING EUTECTIC MIXTURE OF LOCAL ANAESTHETIC AND LOCAL INFLITRATION V/S LOCAL INFILTRATION ALONE

Dr. Pranali Patil Consultant Anaesthesiologist , Apollo Hospital, Navi Mumbai.

Dr. Archana Mhatre* Professor , Department Of Anaesthesia, THRC , Nerul. *Corresponding Author

ABSTRACT

BACKGROUND : Pain is unpleasant sensory and emotional experience . Epidural anaesthesia and /or analgesia techniques are commonly used and to facilitate insertion of epidural catheter local anaesthetic infiltration is used . but many times this pr oves insufficient for pain relief.

Hence this study was undertaken to study more effective way of providing pain relief for epidural insertion using EMLA cream with 2% lignocaine and 2% lignocaine alone.

MATERIAL AND METHODS : A randomized, prospective and observer blinded study was conducted to compare the efficacy of topical 5% lignocaine – prilocaine cream (EMLA) followed by 2% lignocaine infiltration against 2% lignocaine infiltration alone for epidural needle in adults.

- Group EL: Patients receiving 2.5gms. of 5% EMLA (Eutetic mixture of local anaesthetics) along with 2cc lignocaine infiltration over the site of epidural needle placement. (50 patients in each group)
- Group L: Patients receiving 2cc of 2% lignocaine infiltration only.

(50 patients in each group)

Baseline parameters, relevant intra-op details, painrelief using VAS and VRS score was compared in both groups

CONCLUSION : From our study we conclude that use of EMLA 1 hour before the placement of epidural needle positively reduces the pain and hence should be used whenever possible so that maximum patients get the benefit of analgesia.

EMLA cream did not produce any adverse effect in any of the patients except for mild blanching in few patients.

KEYWORDS : Pain Relief , Epidural Injection, 2% Lignocaine, Emla Cream, Vas & Vrs Score.

INTRODUCTION

Pain has been defined by Merskey[1] as an unpleasant sensory and emotional experience associated with actual or potential tissue damage". Relief of pain is a boon to mankind and anaesthesiologists are concerned with pain relief in the perioperative peri

Epidural anaesthesia and/or analgesia techniques are used widely in present day anaesthesia practice. This is often achieved by either a single shot techniques or by a placement of a catheter in the epidural space. To facilitate placement of epidural needle (18G or 16G) infiltration of local anaesthetic solution is commonly used. But many a times this local infiltration may be insufficient for adequate analgesia. Also, local infiltration itself can cause discomfort and/or pain in many of the patients.

Pain relief during epidural needle placement is required to ensure patient co-operation. Better co-operation presumably results in easier siting of the epidural space and less number of needle passes causing decreased trauma to the tissues. Also patients may be more amenable to this type of anaesthesia at a subsequent time.

Topical 5% lignocaine-prilocaine cream (EMLA. Eutectic Mixture of local anaesthetics) allows topical topical cutaneous anaesthesia. It has been shown to produce dermal anaesthesia for skin punture during intravenous cannulation in adults and in children[2,3,4]. EMLA is also used for spinal puncture in children and in radial artery cannulation[5].

But its use has not been tried for epidural needle placement, in which 16G or 18G needle is used. As this needle is a big bore needle, it is more painful than a lumbar puncture[6]. Hence local infiltration of lignocaine is used commonly to alleviate the pain of epidural needle puncture.

This study is an attempt to compare the analgesia offered by topical 5% lignocaine – prilocaine cream (EMLA) followed by 2% lignocaine infiltration against 2% lignocaine infiltration alone for epidural needle placement.

AIMS AND OBJECTIVES

1. To compare the analgesic action of EMLA with local infiltration of 2% 2cc lignocaine against local infiltration with 2% 2cc of lignocaine alone during epidural needle placement.
2. To observe any adverse reactions of EMLA cream.

MATERIALS AND METHODS

A randomized, prospective and observer blinded study was conducted to compare the efficacy of topical 5% lignocaine – prilocaine cream (EMLA) followed by 2% lignocaine infiltration against 2% lignocaine infiltration alone for epidural needle in adults.

Permission from Institutional Ethics committee was obtained. Hundred patients in the age group of 18 years to 65 years who required epidural anaesthesia/ analgesia for pelvic, abdominal or lower limb surgeries were studied. Patients of either sex with ASA Class I or II posted for routine surgery were selected.

- **Group EL:** Patients receiving 2.5gms. of 5% EMLA (Eutetic mixture of local anaesthetics) along with 2cc lignocaine infiltration over the site of epidural needle placement. (50 patients in each group)
- **Group L:** Patients receiving 2cc of 2% lignocaine infiltration only.

(50 patients in each group)

Procedure was explained to all the patients. The use of VAS scale was explained to the patients. The informed written consent was obtained. Patients with known or suspected hypersensitivity to local anaesthetics were excluded from the study.

Thorough pre-operative evaluation was done with special reference to history of any allergy of local anaesthetic as well

as history of any drug intake e.g. choloquine, primaquine, nitrates, nitroglycerine, para-aminosalicylic acid was confirmed. General examination findings along with the investigation were noted. In both groups, epidural needle placement was done using 16G Tuohy's needle. Any patients who required more than two attempts in siting the epidural space were excluded from the study.

In group EL, after checking the vitals of the patient, sixty minutes prior to epidural needle placement, 5 grams of 5%. EMLA cream over two lumbar intervertebral space ($L_{2-3}$and L_{3-4}) was applied on the skin surface area of 9 cm^2 [2.5 gms over each space]. The cream was covered with opsite occlusive dressing. The patients were in sitting position after application of cream.

Patients were wheeled into the operation theatre and all essential monitors like blood pressure cuff, ECG monitor and pulse oximeter were attached. Peripheral intravenous line was obtained with 18G cannula and intravenous fluids were started at the rate of 10 ml/kg. Patients were made to sit on the operation table, occlusive dressing was removed and the cream was wiped off. Any allergic reaction was observed and noted. Painting and draping was done. 2ml of 2% lignocaine infiltration was done using 1.5 inches long 25G needle. After waiting for 3 min 16G epidural needle was inserted by using standard technique of loss of resistance.

In group L, patients did not receive any EMLA application. Patients were wheeled in the operation theatre. The monitors were attached to the patients. Peripheral intravenous line was obtained with 18G cannula and intravenous fluids were started at the rate of 10 ml/kg.

Scoring of pain was also done using following simple four category verbal rating scale (VRS)[10].
VRS:
1. No response from patient (No pain or minimal pain)
2. Mild facial grimace
3. Verbal response
4. Withdrawal of back.

The person performing epidural needle placement was second or third year resident of anaesthesia having adequate experience of epidural needle placements (at least 40-50 epidural anaesthesia). The observer was common to all the patients and was not aware to which group patient belonged to.

In this study, for each parameter of both the groups, mean and standard deviation were calculated. To find out the significant changes within the group "paired t test" was applied. "Analysis of variance" calculated between the two groups.

$P < 0.05$ was taken as significant difference.

OBSERVATION AND ANALYSIS

A study of comparison of efficacy of topical lignocaine-prilocaine cream [EMLA] with 2% lignocaine infiltration against 2% lignocaine for analgesia during epidural needle placement was carried out in 100 patients with 50 patients in each group.

Group EL {EMLA + Lignocaine infiltration} and Group L {Local infiltration alone} where pain experienced by the patients at the time of epidural needle placement was compared using visual analogue scale [VAS] and verbal rating score [VRS].

Both the groups were comparable as age, sex as shown in table below.

Table No. 1: Demographic Changes
AGE AND SEXWISE DISTRIBUTION OF THE PATIENTS

GROUP	Sex		Age in years	
	Female	Male	Mean	SD
EL (n = 50)	17	33	38.7	13.8
L (n = 50)	14	36	37.7	15.5
P- value	0.52		0.73	
Significance	Not Significant		Not Significant	
Above data shows that both the groups are comparable.				

Table No. 2 Hemodynamic parameters in group EL

GROUP EL	Mean	SD	t	P – Value	Significance
BGLA Pulse (/min)	87.68	11.94	2.22	0.03	Significant
AENP Pulse (/min)	85.86	12.80			
BGLA SBP (mm Hg)	125.20	11.68	2.93	0.01	Significant
AENP SBP (mm Hg)	123.12	11.00			
BGLA DBP (mm Hg)	82.12	6.69	1.21	0.23	Not Significant
AENP DBP (mm Hg)	81.20	6.27			

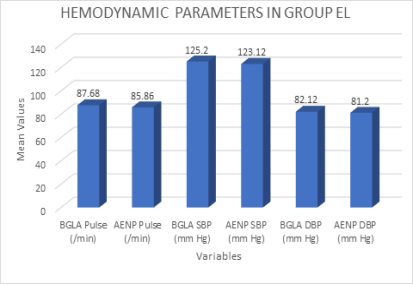
{BGLA = Before giving LA; AENP = After Epidural Needle Placement}

[* = Paired t – test applied]

Above data reveals that the difference between pluse rate before giving local infiltration and after epidural needle placement was stastically sigificant ($P < 0.05$). But this diiference was clinically insignificant in many patients.

In EL group, mean systolic blood pressure before local infiltration and after epidural needle placement showed stastically significant difference as $P < 0.05$, but clinically not significant.

In Group EL, the statistical difference between the mean diastolic blood pressure before local infiltration and after epidural needle placement was statistically insignificant.



GROUP L

Table No. 3 Hemodynamic parameters in group L

Group L	Mean	SD	T*	P – Value	Significance
BGLA Pulse (/min)	86.76	12.38	-5.11	0.00	Extremely Significant
AENP Pulse (/min)	91.98	14.59			
BGLA SBP (mm Hg)	124.60	11.17	-2.40	0.02	Significant
AENP SBP (mm Hg)	128.20	12.24			
BGLA DBP (mm Hg)	82.52	7.45	-1.83	0.07	Not Significant

AENP DBP (mm Hg)	84.20	6.73			

{BGLA = Before giving LA; AENP = After Epidural Needle placement}

{SBP = Systolic Blood Pressure; DBP = Diastolic Blood Pressure}

[* = Paired t – test applied]

Above data shows that the preprocedural rate and after epidural needle placement pulse rate in group L was statistically extremely significant as P = 0.

In Group L pre-procedural systolic blood pressure and after epidural needle placement difference was statistically significant as P< 0.05, but clinically not significant.

In Group L the diiference in diastolic blood pressure before local infiltration and after epidural needle placement as compared to P >0.5 was statistically insignificant.

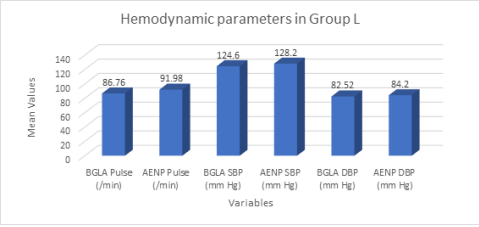


Table No. 4 Hemodynamic parameters in group EL and group L

GROUP		Before giving LA			After Epidural Needle Placement		
		Pulse/ min	SBP mmHg	DBP mmHg	Pulse/ min	SBP mmHg	DBP mmHg
EL	χ	87.7	125.2	82.1	85.9	123.1	81.2
	SD	11.9	11.7	6.7	12.8	11.0	6.3
L	χ	86.8	124.6	82.5	91.7	128.2	84.2
	SD	12.4	11.2	7.5	14.6	12.2	6.7
ANOVA*	P	0.71	0.79	0.78	0.04	0.03	0.02
	Sign.	NS	NS	NS	S	S	S

{NS = Not Significant; S = Significant}

{*=Analysis of Variance calculated between the two groups}

BEFORE GIVING LA :

Both the groups are comparable with regard to pulse rate systolic and diastolic blood pressure.

AFTER EPIDURAL NEEDLE PLACEMENT:

Statistically significant increase in pulse rate, systolic and diastolic blood pressure in group L.

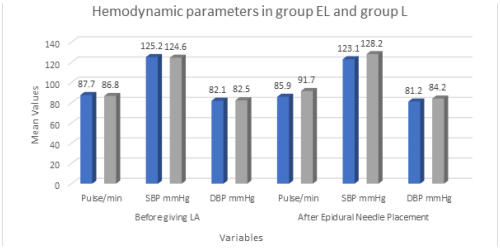


Table No. 5 VAS Scores and VRS scores in two groups

GROUP		VAS (mm)	VRS
EL	χ	4.0	1.2
	SD	6.6	0.4
L	χ	35.9	2.6
	SD	20.4	0.7
ANOVA*	P	0.00	0.00
	Significance	Extremely Significant	Extremely Significant

{NS = Not Significant; S = Significant; ES = Extremely Significant}

{* = Analysis of Variance calculated between the two groups}

Above data reveals that the diiference between VAS Scores in Group EL and Group L was statistically extremely significant. The difference between VRS scores in Group EL and Group L was statistically extremely significant.

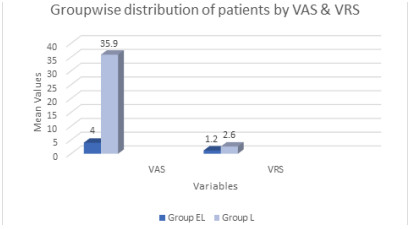
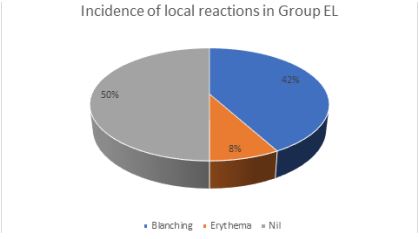


Table No. 6 Incidence of local reactions in Group EL

Local Reaction-	Frequency	Percent
Blanching	21	42.00
Erythema	4	8.00
Nil	25	50.00
Total	50	100.00

Above data reveals that 42% patients had blanching, 8% patients showed erythema and no reaction in 50% patients.



DISCUSSION

Epidural anaesthesia and/or analgesia techniques are widely used in present day anaesthesia practice. Epidural needle is a large bore needle (16G/18G) and has a blunt tip. It pierces through skin, subcutaneous tissue, supraspinous ligament, intraspinous ligament and ligamentum flavam before entering the epidural space. It is understandable that this needle penetration will be painful and some analgesia is required for the same to ensure patient cooperation.

The most commonly used method to provide analgesia is local anaesthetic infiltration of skin, subcutaneous tissue along with deep tissues at the site of epidural needle insertion. But pain is experienced by the patients during infiltration of local anaesthetic and also during epidural needle placement suggesting this method alone may provide inadequate analgesia. Perhaps, heavily premedicated patients may be able to tolerate this pain. But in unpremedicated or lightly premedicated patients, this may be an unpleasant experience.

Eutectic mixture of local anaesthetics [EMLA] cream has been found to provide topical cutaneous anaesthesia during intravenous cannulation in adults and children[2,3,4].

It has also been shown to produce dermal anaesthesia before skin puncture during arterial cannulation[5] and lumbar puncture[6] in children. However there is no reported study of EMLA usage before epidural needle placement.

Thus the present study was planned to assess the efficacy of EMLA cream in alleviating pain of epidural needle placement when used in conjunction with lignocaine infiltration against 2% lignocaine infiltration at the site of epidural needle placement.

Hundred patients in the age group of 18 to 65 years who required epidural analgesia or anaesthesia for pelvic, abdominal or lower limb elective surgeries were selected. The study was approved by Institutional ethics committee. All the patients belonged to ASA class I or II. Patients with known or suspected allergy to local anaesthetics were excluded. The patients who required more than two attempts for the localisation of epidural space were not included in the study.

Informed consent to enter the study was taken. Procedure was expalined to the patients. All the questions asked by the patients were answered. For pain assessment visual analogue scale and vebal rating scale were used. Patients were taught the use of Visual Analogue Scale (VAS) on the previous day of surgery.

Visual analogue scale[29, 30] is an easy, effective and sensitive way to measure the intensity of pain. It is simple to use, efficient and can be quickly analysed. The scale consits of 0 to 100 numbers. It is 10 cm in length thus each number is placed at one millimeter denoting 0 as no pain and 100 as worst pain imaginated.

The scale could be horizontal, vertical or curvilinear. One can place a slide corresponding to the degree he/she feels the pain. It can be used by educated and uneducated patients.

VAS helps to measure the efficacy of analgesia by noting the scores. However, it does not measure nature, loaction and psycological aspect of pain.

In our present study, the above 10 cms VAS scale has been used. On the same scale, the other side shows five faces with different expressions corresponding to different intensities of pain which can be correlated with numerical scale.

The patients were divded into two groups.

GROUP EL:
Patients receving EMLA cream along with local infiltration [n = 50]

GROUP L:
Patients receving only local infiltration. [n = 50]

In the preoperative room patients in group L did not recevie any EMLA application. In the group EL 5 gms of EMLA cream was applied over two intervertebral space [L_{2-3} and L_{3-4}] 2.5 gms over each intervertebral space. This was applied about sixty minutes prior to the epidural needle placement. The cream was applied over 9 cm^2 area forming a thick layer. This was applied over two intervertebral spaces (L_{2-3} and L_{3-4}) as failure to site epidural space in one intervertebral space can enable to try the other site.

In the study done by E. L. Maunuksela et al[13] for effect of EMLA on the pain associated with venous cannulation the authors had used two gms of EMLA cream. In the study by L. Arendt et al[31] 5 gms of EMLA was applied over four sites i.e. 1.25 gms/ site.

In our pilot study we found 1.5 gms to be ineffective probably because of the fact that the cream is applied over 9 sq. cm, hence requiring more amount. Studies have shown the necessity of a thick cream application to ensure adequate analgesia. Therefore we decided to use 2.5 gms/ site.

The cream was covered with a plastic non-permeable occlusive dressing i.e. opsite as it is must for its effectiveness. Patients were made to sit after application of the cream to prevent the displacement of the occlusive dressing by movement of back.

Nilsson et al[31] in there study to compare pain relief due to topical EMLA and local infiltration anaesthesia for radial artery cannulation used tegaderm as occlusive dressing which is similar to opsite.

Bjerring and L. Arendt-Nielsen[31] in one study to determine depth and duration of skin analgesia after topical EMLA application observed that maximum alleviation of pin-prick pain occurs after 60-90 min application of cream.

A study conducted by Hallen. B. Olsson G et al[10] showed that it was not possible to reduce this application time if good pain relief was to be obtained.

Inside the OT intravenous peripheral line was secured and intravenous fluids were started. ECG monitor, pluse oximeter and blood pressure cuff were attached to the patients. Baseline parameters like pulse rate, blood pressure were recorded in all the patients.

Patient was made to sit on the table and then opsite was removed. In Group EL Cream was wiped off with gauze piece. Any skin reaction due to EMLA cream was observed and recorded. In our study, 42% patients had blanching, 8% patients had erythema, 50% patients showed no skin reaction (Table number 6)

In the study done by B. Hallen, P. Carlsson and A. Uppfeldt[11] for use of lignocaine-prilocaine cream to relieve pain of venepuncture, they observed blanching in 26% paitents erythema in 10% patients while no skin reaction in other patients.

The procedure of epidural needle placement was standardized for all the patients.

25G 1.5 inch long needle was used for infiltration in the intervertebral space. A skin wheal is raised and 2ml 2% lignocaine infiltrated to a depth about 1 inch.

Epidural needle [16G Touhy needle] was inserted 3 minutes after local infiltration. Loss of resistance technique was used to site the epidural space.

We studied haemodynamic parameters before and after epidural needle placement, visual analogue scale, verbal rating scale to compare the pain experienced by patients in both the groups.

Haemodynamic parameters were studied as pain presu mably causes release of catecholamines and thereby causing rise in pulse and blood pressure.

HAEMODYNAMIC PARAMETERS-
The pre-procedural hemodynamic parameters are compa rable in both the groups.

PULSE-
The mean pre-procedural pulse rate in group EL was 87.7 ± 11.9/ min and that of L group was 86.8 ± 12.4/ min. On comparison [P > 0.5] the statistical difference is significant

[Table No 4]

In group EL mean pulse rate after epidural needle placement was 85.9 ± 12.8 and in group L was 91.7 ± 14.6 which was statistically significant as P value < 0.05 [Table No 4]

The pre-procedural pulse rate in EL was 87.7 ± 11.9/min and after epidural needle placement pulse rate was 85.9 ± 12.8/min. This was statistically significant as P < 0.05. But this difference was clinically insignificant in many patients. [Table No 2]

The pre-procedural pulse rate in group L was 86.8 ± 12.4/min. rate and after epidural needle placement pulse rate was 91.7 ± 14.6/min. This is as statistically extremely significant as P=0 [Table No 3]

BLOOD PRESSURE-

The pre-procedural systolic blood pressure had a mean value of 125.2 ± 11.7 in EL group and 124.6 ± 11.2 in L group. The P > 0.5 value projects this difference as statistically insignificant. (Table No 4)

After epidural needle placement, mean systolic blood pressure were 123.1 ± 11 and 128.2 ± 12.2 in EL and L groups respectively. The P < 0.05 value projects the difference as statistically significant. (Table No 4)

I EL group, mean systolic blood pressure before local infiltration was 125.20 ± 11.68 mmHg and 123.12 ± 11 mmHg after epidural needle placement. The difference is statistically significant as P < 0.05, but clinically not significant. (Table No 2)

In group L pre-procedural systolic blood pressure was 124.6 ± 11.2 and after epidural needle placement was 128.2 ± 12.2 in group L. This difference was statistically significant as P < 0.05, but clinically not significant. (Table No 3)

Also the diastolic blood pressure before local infiltration had a mean value of 82.1 ± 6.7 in EL group as compared to P > 0.5 makes this difference statistically insignificant. (Table No 4)

The mean diastolic blood pressure after epidural needle placement was 81.2 ± 6.3 in EL group and 84.2 ± 6.7 in L group. Eventhough the EL group could not be stated as showing a hypotensive reading the difference is statistically significant since P < 0.05. (Table No. 4)

In Group EL the diastolic blood pressure was 82.12 ± 6.69 before local infiltration and 84.2 ± 6.73 after epidural needle placement as compared to P > 0.5 makes this different statistically insignificant. (Table No 2)

In Group L the diastolic blood pressure was 82.05 ± 7.5 before local infiltration and 84.2 ± 6.73 after epidural needle placement as compared to P > 0.5 makes this different statistically insignificant. (Table No 3)

VERBAL RATING SCALE

After epidural needle placement scoring of pain was done using four category verbal rating score (VRS).

In group EL mean VRS score was 1.2 ± 0.4 and in group L VRS score was 2.6 ± 0.7. As P value is 0.0 this difference is extremely significant. (Table No 5)

M. Smith, B. M. Gray et al conducted a study comparing EMLA versus local infiltration anaesthesia for radial artery cannulation where they found that the verbal rationg scores were significantly lower in EMLA groups. In EL group VRS score was 2.3 ± 0.6 while in group L it was 4.2 ± 0.2. (P < 0.001)

In study done by E-L Maunuskela et al for effect on the pain associated with venous cannulation using EMLA cream verbal rating scale was used. In this study EMLA group showed very low score than placebo group, though actual value are not mentioned. Ozolins et al in a similar study also showed lower VRS score in EMLA group.

VISUAL ANALOGUE SCALE (VAS)

In our pilot study, during placement of epidural catheter, many patients experienced additional pain possibly due to stimulation of nerve root. Hence VAS pain assessment was used before the placement of catheter as most of the patients had a catheter placed for continuous epidural anaesthesia.

Following Epidural needle placement patients were given visual analogue scale to quantity the discomfort experienced during the procedure. In our study, mean visual analogue scale (VAS) score in group EL was 4 ± 6.6 and in group L 35.9 ± 20.4. (Table No 5)

Thus VAS score is statistically extremely significant as P value is 0. M. Smith, B. M. Gray et al[16] conducted a study comparing EMLA versus local infiltration anaesthesia for radial artery cannulation. In the group using EMLA, VAS score was 25.3 ± 12.3 mm while in group L VAS score were 45.7 ± 23.2 mm. Thus EMLA group had significantly lowe VAS scores than the lignocaine infiltration group.

From their study M. Smith, B. M. Gray et al arrived at a conclusion that during arterial cannulation in adults 5% EMLA cream was more effective than intradermal infiltration with lignocaine which itself can be a painful procedure. This pain is due to needle penetration in the skin and deposition of local anaesthetic intradermally.

Luc- Marie Joly et al[32] in their study done for comparison between EMLA and local infiltration for radial cannulation, VAS score in EMLA group was 20 ± 10 mm and that of EMLA group was 70 ± 10 mm. Thus it is significantly low in EMLA group.

In our study, we used an anaesthetic composition of prilocaine and lignocaine which forms a eutectic mixture with a high concentration of active substance in each droplet. The penetration of topically applied local anaesthetic like ketocaine through the skin has been investigated by the use of isotope technique[33,34]. It was found that most of the substance remained in superficial stratum corneum. Preliminary studies of EMLA composition using the same technique suggest a similar penetration and distribution of local anaesthetic.

Numerous receptor responding to mechanical stimulus are present in the skin and these receptors are either Aδ-type with fast myelinated fibers[35] or C-type with slow unmyelinated fibers. C-fibers are also present in the subcutaneous tissue and in the vascular wall. A needle inserted through the skin acts as a strong stimulus which will cause discharges in both types of fibres.

From our study, it was seen that both the mean VAS and VRS scores were much higher in Group L than Group EL. The difference was statistically extremely significant. The pain experienced by the patient was described as dull or moderate pain and this could be related to the penetration of the subcutaneous tissue and the skin.

The deeper layers i.e. supraspinous, interspinous ligament and ligamentum flavum have poor nerve supply and can be pierced with very minimal pain. Despite the fact that penetration of EMLA is upto 9 mm [5-9 mm] in various studies, patients did not experience much pain even during the traverse of the needle through the deeper structures as

evidenced by lower scores in Group EL. Thus EMLA is used to obtund the signals from the most painful area.

EMLA cream can be effectively be used for elective surgeries and also during emergency surgeries if proper co-ordination between surgical, nursing and anaesthesiologists team is maintained. Also maximum time upto which EMLA applied site can br pricked painlessly is upto 5 hrs. therefore in case of postponement of surgeries, it can be still used effectively.

EMLA has ease of application. It does not require any technical skills to apply it. Even nursing staff can apply it. It is totally non-invasive way of analgesia. Also absorption of topical lignocaine-prilocaine cream when applied over small area and intact skin is very minimal[27]. There are no reported toxic blood levels of lignocaine and prilocaine after topical application. Thus making it safe.

The cost of 5% EMLA cream used for each patient and occlusive dressing added together is Rs. 70 per patient which is much greater than the cost of materials used for lignocaine infiltration technique i.e. Rs. 6 per patient.

However this cost of EMLA cream can be reduced to approximately to half by applying it to only one site. Also seemingly appearing costly, this cost is a small fraction of the total surgical expenses. Hence considering the amount of pain relief and patient co-operation, it is still worth using it.
Thus 5% EMLA cream proved to be safe and effective for epidural needle placement in adults.

SUMMARY

In our study, the efficacy of topical 5% EMLA cream along with 2% lignocaine infiltration was compared with that of 2% lignocaine infiltration alone in alleviating pain of epidural needle placement.

GROUP EL –

Patients receiving 2.5 grams of 5% EMLA [Eutectic mixture of local anaesthetic] on the surface area of 9 sq. cms. Over each lumbar intervertebral space [L_{2-3} and L_{3-4}] along with 2cc 2% lignocaine infiltration over the site of epidural needle placement.

GROUP L –

Patients receiving 2 cc 2% lignocaine infiltration at the site of epidural needle placement.

Parameters like pulse rate, systolic and diastolic blood pressure were recorded before local infiltration and after epidural needle placement in both the groups.

Following epidural needle placement, pain produced by the insertion of epidural needle was assessed by the patient using a visual analogue scale and a four category verbal rating score.

It was observed that

- At the time of epidural needle placement pulse rate decrease in group EL was 2.22% as compared to 5.11%. Increase in pulse rate in group L, the difference was significant statistically but not clinically.
- During epidural needle placement the systolic blood pressure decrease in EL group was 2.93% as compared to increase 2.40% decrease in group L. This difference was statistically significant but not clinically.At the time of epidural needle placement the decrease in diastolic blood pressure was 1.21%in group EL as compared to 1.83% decrease in group L. This difference was also statistically significant but not clincially.
- During epidural needle placement, mean verbal rating score was 1.2 ± 0.4 in group EL and 2.6 ± 0.7 in group L, the difference was statistically extremely significant.
- Following epidural needle placement, pain assessment done by visual analogue scale showed mean VAS score of 4 ± 6.6 and 35.9 ± 20.4 in group EL and group L respectively. VAS score was much higher in group L and this making the difference extremely significant.
- The cost of 5% EMLA and occlusive dressing is much greater than the cost of the materials used for lignocaine infiltration technique. However comparing the cost of EMLA with total surgical and hospital expenses it is small fraction of it.
- Skin manifestation, blanching due to EMLA cream was much higher as compared to erythema i.e. 42% patients showed blanching and 8% showed erythema while no reaction in other patients.

It can definitely be used in elective surgeries with proper co-ordination with surgical and nursing team.

CONCLUSION

From our study, which was designed to compare the efficacy of topical 5% EMLA cream along with 2% lignocaine infiltration versus 2% lignocaine infiltration alone to alleviate pain of epidural needle placement in adults we conclude that:-

- Local infiltration provides analgesia which can be ranging from very mild to good in patients
- [VAS in group L 35.9 ± 20.4]
- [VRS in group L 2.6 ± 0.7]
- When supplementing this with EMLA cream there is a clinically and statistically significant alleviation of pain as seen from VAS and VRS scores.
- [VAS in group EL 4 ± 6.6]
- [VRS in group EL 1.2 ± 0.4]
- From our study we conclude that use of EMLA 1 hour before the placement of epidural needle positively reduces the pain and hence should be used whenever possible so that maximum patients get the benefit of analgesia.
- EMLA cream did not produce any adverse effect in any of the patients except for mild blanching in few patients.

REFERENCES

1. Jay, S. M. Ozolins, M and Eliot, C. H. (1983) Assessment of children's distress during medical procedures. Health Psychol., 2, 133.
2. Soliman I, Broadman L, Hanallah R. S, McGill WA. Comparison of the analgesic effects of EMLA (Eutectic mixture of local anaesthetics) to intradermal lidocaine infiltration to venous cannulation in unpremedicated children. Anaesthsiology 1988; 64 806-8.
3. C. S. Hopkins, C. J. Buckley et al: Use of a lignocaine-prilocaine cream to prevent pain at intravenous induction of general anaesthesia in 1-5 year old children. Anaesthesia 1988; 43: 198-201.
4. Hallen B, Carlsson P, Uppfeldt A. Clincial study of a lognocaine-prilocaine cream to relieve pain of venepuncture. British Journal of Anaesthesia 1985; 57: 326-328.
5. Iris E. Soliman et al: Comparison of the analgesic effects of EMLA to intradermal lidocaine infiltration prior to venous cannulation in unpremedicated children. Anaesthesiology 1988; 65: 804-806.
6. Nilsson A, Danielson K, Engberg G, Henneberg S. EMLA for pain relief during arterial cannulation – a double-blind placebo-controlled study of a lignocaine-prilocaine cream. Ups J Med Sci 1990; 95: 87-94.
7. Robert K. Stoelting – Pharmacology and Physiology in Anaesthetic practice 3rd edition 158-178.
8. Lennart Juhlin, H. Evers et al: A lidocaine-prilocaine cream for superficial skin surgery and painful lesions. Acta Dermatovenerology. (Stockholm); 60: 544-546.
9. G. M. E. Ehrenstrom Reiz et al: EMLA – a eutectic mixture of local anaesthetic for topical anaesthesia. Acta Anaesthesia Scandinavia 1982; 26: 596-598.
10. B. Hallen et al: Effect of timing of local anaesthetic cream. Anaesthesia 1984; 39: 969-972.
11. B. Hallen, P. Carlsson et al: Clinical study of lignocaine-prilocaine cream to relieve the pain of venepuncture. British journal of Anaesthesia 1985, 57: 326-328.
12. H. Evers et al: Dermal effects of compositions based on the eutectic mixture of lignocaine and prilocaine. British journal of Anaesthesia 1985; 57: 997-1005.
13. E. L. Maunuksela et al: Double blind evaluation of a lignocaine-prilocaine cream (EMLA) in children. British journal of Anaesthesia (1986); 58: 1242-1245.
14. C. S. Hopkins, C. J. Buckley et al: Use of a lignocaine-prilocaine to prevent pain at intravenous induction of general anaesthesia in 1-5 year old children. Anaesthesia 1988; 43: 198-201.
15. Soliman et al: Composition of the analgesic effects of EMLA to intradermal lidocaine infiltration prior to venous cannulation in unpremedicated children. Anaesthesiology 1988; 65: 804-806.

16. M. Smith, B. M. Gray et al: Double-blind comparsion of toipcal lignocaine-prilocaine cream (EMLA) and lignocaine infiltration for arterial cannulation in adults. British journal of Anaesthesia 1990; 65: 240-242.
17. O. Hogan Quinn H: Lumbar epidural anatomy – A new look by cryomicrotome section. Anaesthesiology; 1991; 75; 767-775.
18. Hogan Quinn H: Regional anaesthesia and analgesia. Editor: David L. Brown. Chapter 4; 50-83.
19. Hogan Quinn H: Epidural anatomy – New observations. Can. Jr. Anaesth; 1998; 45; 5; 45-48.
20. Blomberg RG, Olsson SS: The lumbar epidural space in patients examined with epiduroscopy. Anesth. Analg. 1984; 68; 157-160.
21. Savolaine ER, Pandya JB et al: Anatomy of the lumbar epidural space – new insights using CT-Epidurography. Anaesthesiology; 1998; 68; 217-220.
22. Asato F, Hirikawa N, Oda M et al: A median septum is not a common cause of unilateral epidural blockade. Anaesthesia Analgesia; 1990; 71: 427-429.
23. Husimeyer R. P. and White D. C. Lumbar Extradural injection pressures in pregnant women, and investigation of relationship between rate of injection, injection pressures and extent of analgesia. Br. J. Anaesth 52-55 (1980).
24. Shah JL: Influence of CSF on epidural pressure. Anaesthesia; 1981; 36; 627-631.
25. R. S. Satoskar, S. D. Bhandarkar – Pharmacology and pharmacotherapeutics 13th edition 195-200.
26. Covino B. G. and Vallaso H. (1976) Local anaesthetics: Mehcanism of action and clinical use. New York: Grune and Stratton.
27. Product Information.
28. Ronald D. Miller – Anaesthesia Vol. 1; 1124-1130.
29. Revill S. I. Robinson J. O. et al: The reliability of a linear analogue for evaluating pain. Anaesthesia 1976; 31: 1191.
30. Ohnhaus E., and Adler R. (1975). Methodological problems in the measurement of pain: a comparison between verbal rating scale and visual analgoue scale. Pain 1, 379.
31. Bjerring and L. Arendt – Nielsen. Depth and duration of skin analgesia to needle insertion after topical application of EMLA cream. BJA 1990; 64, 173-177.
32. Luc- Marie- Christian Spaulding et al. Anaesthesia Analgesia 1998, 403-6. Topical Lignocaine – Prilocaine cream (EMLA) vs. Local infiltration anaesthesia for radial artery cannulation.
33. Akerman B; Percutaneous local anaesthesia. Acta Anaesthesia Scandinavia 1978; 70: 90.
34. Ponten B, and Ohlsen L: Skin surface application of ketocaine to provide local anaesthesia for cutting split skin grafts. British journal of Plastic Surgery 1977; 30: 251.
35. Wylie and Churchill Davidson's – A practice of anaesthesia 6th edition 172-186.
36. Mc Gregor Surgical Anatomy Page no. – 555.