ISSN (Online) : 2455 - 3662
SJIF Impact Factor :5.148

EPRA International Journal of

Multidisciplinary Research

Monthly Peer Reviewed & Indexed
International Online Journal

Volume: 5 Issue: 6 June 2019

Published By :EPRA Publishing

Volume: 5 | Issue: 6 | June 2019 || SJIF Impact Factor: 5.148 ISSN (Online): 2455-3662

EPRA International Journal of
Multidisciplinary Research (IJMR) *Peer Reviewed Journal*

SOMATOSENSORY BLOCK IN RELATION TO NON CONVERSION AND CONVERSION OF LUMBAR EPIDURAL ANAESTHESIA TO GENERAL ANAESTHESIA USING PULSE OXIMETER TECHNOLOGY AS MONITORING TOOL FOR LOWER SEGMENT CAESAREAN SECTION SURGERY

Zafri bin Yusoff[1*]
[1] Institut Latihan Kementerian Kesihatan
Malaysia Sultan Azlan Shah Perak Malaysia

Ir. Dr Ahmad Faizul Bin Shamsudin[2*]
[2]Associate Professor,
Universiti Sultan Azlan Shah (USAS),
Bukit Chandan Kuala Kangsar,
Perak Darul Ridzuan,
Malaysia

ABSTRACT

Background. ***Currently lumbar epidural was considered to be the gold standard in anaesthesia practice. Elements involved in epidural anaesthesia procedure were generally individual to the patient's anatomy, epidural catheter location and response to the medications..***

Method. ***The total number of hundred and sixty (n = 160) parturient undergoing lumbar epidural anaesthesia for lower segment caesarean section LSCS enrolled in this mono centric study. Parturient were in the range of age 16 - 45 years old with ASA 1, II and II involved in the study. Visual Analogue Pain Scores VAPS, Bromage scale and perfusion index PI were used as instrument to assess epidural block.***

Result. Demographic characteristic did not influence epidural failure. Elements of somatosensory such as Visual Analogue Pain Score, Bromage Scale would be the best assessment of the epidural anaesthesia failure. However, perfusion index could not be used as indicator for assessment of somatosensory block

Conclusion. ***New heuristics as Transition Policy Anaesthesia Analysis TAPA could be developed for bridging the gaps in in determination of failure for epidural anaesthesia especially for caesarean section. Perfusion index PI as displayed by Pulse Oximeter Technology did not have roles for indicating somatosensory block for both non conversion and conversion of epidural anaesthesia to general anaesthesia for Lower Segment Caesarean Section Surgery***

Recommendation: Future direction Technologic advances should be used as way to predict epidural failure such as Transcutaneous Electrical Nerve Stimulation (TENS). Ultrasound imaging of the spine could be proposed to facilitate identification of the epidural space and predict difficult spine score, especially in women with abnormal lumbosacral anatomy (scoliosis) and those who were obese. It should be a good level of success in the ultrasound-determined insertion point and very good agreement between ultrasound depth (UD) and needle depth (ND).

KEYWORDS - ***Pulse Oximetry/Capnograph, Perfusion Value Index SpO_2, Epidural Failure, Lower Segment Caesarean Section LSCS, Epidural Anaesthesia/Lumbar Epidural Anaesthesia***

INTRODUCTION

Somatosensory block testing was necessary to ensure the degree of blockade sufficient for the LSCS surgery. From our own experiences there were great variations in practice for testing lumbar epidural anaesthesia blockade after administration of local anaesthetic. It was not clearly understood why this happened in clinical anaesthesia practice. We could not even found in any well known textbook how lumbar epidural anaesthesia blocks should be the best option of testing. The method of testing and the metaphor purely depended on the practitioner as well as the type of surgery.

Epidural anaesthesia was a versatile neuraxial anaesthetic technique with an expanding area of indication especially for parturient mothers undergoing LSCS. The use of epidural anaesthesia became so widespread in recent years that many parturient mothers were now requesting repeat epidural anaesthesia for their second or subsequent LSCS. The special focus in this research was to examine hemodynamic changes after epidural administration of local anaesthetics that may provide parameters to predict dermatomal blockade supplemented with Bromage scale. Together with this, pain assessment using Visual Analog Scale (VAS) as a psychometric response scale in the intra operative period was to be applied. Furthermore, some interest was vested here to check the role Pulse Oximeter during epidural anaesthesia for parturient mothers undergoing LSCS as clinical practice and analysing the arterial haemoglobin saturation (SaO_2) with oximetric measurements (SpO_2) at the hand. According to Peduto et al (1994) pulse oximetry assessment during epidural anaesthesia gave a falsely low reading when the oximetric sensor was placed at the upper limbs. Currently, pulse oximeter was used for measuring SpO_2 reading as during epidural anaesthesia parturient mothers undergoing LSCS experiencing hypothermia and poor perfusion. Therefore it was a good idea to check oxygen saturation (SpO_2) in term of Pleth Variability Index (PVI), as a non invasive dynamic indicator for epidural failure among parturient mothers undergoing LSCS.

One valuable consideration LSCS surgery was whether the parturient mothers demonstrated any signs of a response to painful stimuli. If they could not effectively inform about pain, as might occur in the anesthetized state, it became a challenge for the attending anaesthesiologist to evaluate the effectiveness of the epidural anaesthesia being used. In any type of anaesthesia, while anaesthesia produced a vasodilatative effect, pain was known to induce vasoconstriction, and it was unknown whether a painful stimulus would still maintain vasoconstriction under the vasodilated condition in normothermic, anesthetized parturient. At this junction, the perfusion index PI was an indirect, noninvasive, and continuous measure of peripheral perfusion that provided useful information to the practicing anaesthesiologist in clinical settings. Pulse oximetry provided a relatively simple means to continuously monitor PI in conjunction with other critical parameters, i.e., oxygen saturation and pulse rate in anaesthesia practice. Furthermore, it was expected that the PI provided a means of determining an appropriate monitoring site for pulse oximetry.

Technique of epidural anaesthesia procedure involved injection of drugs through a catheter into the epidural space of the spine, blocking the transmission of pain signals through nerves in the spinal cord. This would cause in temporary loss of pain and sensation below the point of injection. Typically, a 4 -inch long needle normally inserted about 2.5 inches deep into the epidural space. The neuromatrix theory of pain as explained by Trout (2004) provided a framework that might explain for the relief of pain for the laboring woman. The concept of a pain "neuromatrix" suggested that perception of pain was simultaneously modulated by multiple influences. Another version of pain theory was reference to conversion to general anaesthesia GA occurred intraoperatively.

Le Tagloa et al (2009) did discussed on their survey data for intraoperative conversion of epidural anaesthesia to GA. Le Tagloa et al (2009) admitted that the surveys lacking to specifically assess current anesthetic practices and to determine the impact of these advances (epidural anaesthesia) on cesarean delivery anesthesia and analgesia. This might be due to poor reliability of tests of block height used in routine clinical practice. Standardized testing of block height with cold, touch, and pinprick were the common practice. There was some concerned about the conversion of epidural anaesthesia for labour to general anaesthesia GA for caesarean section. Unblocked segments or missed Segments (patchy block) occurred more often in parturient than in the general surgical population. The occurrence of residual pain in one area means failure of the total block, since the pain in this area agonizing anaesthesia existed in the neighboring segments.

Actually, majority of parturient mothers could get great benefits from an epidural. Failure of epidural anaesthesia and analgesia noted to occur in our clinical anaesthesia practice. Some technical factors could affect the primary and secondary epidural anaesthesia success rate. Technical problems arose including an appropriate

positioning of the patient, identification of the midline and epidural space, and dislodgement of catheters. In many cases, LSCS surgery was started in the presence of an inadequate block with the reasons for this was not fully understood. The concept of somatosensory block for the intention of decreasing pain perception in epidural anaesthesia was not really available for reference. The context of analgesic need during LSCS surgery by inhibiting somatosensory was not fully discussed in the current literatures. Hypothesis blockade of painful stimuli through epidural anesthesia before the LSCS surgical stimulus still blurred. Our reviews of the current literature for translating the understanding of somatosensory block as preemptive idea into clinically improvements for parturient satisfaction during LSCS surgery still blind.

MATERIAL AND METHOD

Research Design:

This was a descriptive, cross sectional mono centric study at the Obstetric Theatre. It included anesthetic forms of the Anesthesiology Service referring to charts for parturient of various pre gestational body mass indexes BMI who underwent cesarean section. Variables evaluated included age, weight, height, BMI, physical status (ASA), difficulty in epidural puncture, hemodynamic and anesthetic complications. This study was approved by the Ethics Committee for ethical issues of research. This study was self financed by investigators

I. SAMPLING AND METHODS::

Parturient mothers planned for elective and emergency LSCS and undergoing epidural anaesthesia chosen as samples of this study. The sampling power was based on Yamane formula $n = N / (1 + Ne^2)$ Where n = corrected sample size, N = population size, and e = Margin of error (MoE), e = 0.05 based on the research condition. The total population of parturient undergoing lower segment caesarean section LSCS during the study period was 272 parturient. Hence sample chosen was all together 160 calculated using Yamane formula. Lower Segment Caesarean Section LSCS Surgery would not be begun until loss of sensation to pin prick, ethyl chloride spray and fine cotton wool touch achieved bilaterally to maximum level T7. However, quite a number of cases whereby pinprick, ethyl chloride spray and fine cotton wool touch were not applied. If the block did not reach the level T7 within 30 min or with an additional study drug injected and 45 min after the 3rd dose, the patient would be accepted for this the study as epidural failure. Simultaneously motor block been assessed bilaterally using the modified Bromage scale: 1 = no paralysis (full flexion of hip, knee and foot), 2 = unable to flex hip (able to flex knee and ankle), 3 = unable to flex knee (able to flex foot only), 4 = unable to flex hip, knee or ankle joint.

Sampling of the study was done through wide range of age group of all parturient mothers undergoing epidural anaesthesia. The researcher used combination of clinical observational and interventional methods for parturient mothers undergoing for LSCS and examined achievable of satisfactory level of epidural anaesthesia after epidural puncture plus insertion of Tuohy epidural needle and catheter including the injection of drugs used. The Universal Convenience Sampling was used because to have a valid representing of the total populations within the time frame of collecting data.

II. TOOL USED FOR COLLECTING DATA

A check list for LSCS Epidural Anaesthesia was used to collect the data in exploring factors contribute to the satisfactory level of epidural analgesia for parturient mothers planned for elective and emergency LSCS. As clinical practice, a pulse oximeter also been used as continuous monitoring plus as predictor to measure values of SpO_2 for epidural anaesthesia effectiveness. The perfusion index PI was monitored and recorded at five minutes interval for 20 minutes before and after epidural anaesthesia commenced.

III. DATA ANALYSIS

Statistical analyses were performed using SPSS® version 24.0. Frequency or arithmetic mean and standard deviation were calculated for all data. Comparison of categorical variables was made using the chi-square test, Bivariate correlation, Indepenedent T Test and ANOVA were used to evaluate the influence of some variables on successful or failure of epidural anaesthesia with $p < 0.05$ was considered statistically significant.

RESULTS

Demographic & characteristics of the study subjects

A total of hundred and sixty (160) parturient involved in this study. This was from n = 272 of the total population of parturient undergone epidural anaesthesia during the period of data collection 21st January till 10 of July 2017. The mean age of parturient participated in this study was 28.03 with a standard deviation of ± 5.48. The minimum and maximum ages were 16 and 45 years respectively. Parturient with successful epidural anaesthesia reported to have mean age of 27.96 ± 5.47 where as those with epidural failure that needed conversion to general anaesthesia was 29.83 ± 6.11. for this perspective the age groups were not well distributed as proven in the Figure 1. Age group was tested for normality with Shapiro-Wilk $p = 0.00$ $p < 0.05$.

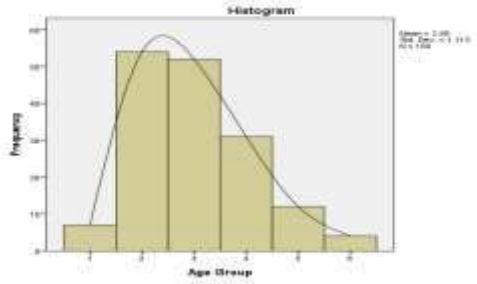

Figure 1: Age groups Distribution

It was very interesting to see the youngest and older age group having high perfusion index PI as compared to the other age groups (Refer Figure 2). There was no significant difference in terms of age group in relation to perfusion index PI as determined by one way ANOVA {F(6,153 = 9.47), p = 0.50, P > 0.05} as revealed by pos hoc Tamhane's T_2.

Figure 2: Perfusion Index in Relation to Age Groups

It was noted that mean gravida was 1.84 with minimum and maximum gravida 1 and 7 respectively. At this particular incident, it was observed also that mean parity was 0.86 ± 1.22. On the other hand, successful epidural group had mean parity of 0.76 ± 1.17 and epidural conversion group to general anaesthesia was 1.00 ± 1.10. With this, mean parity was 0.86 ± 1.22. Both elements of para and gravida were not well distributed and again tested for normality with with Shapiro-Wilk p = 0.00 p < 0.05. There was no significant difference in terms of gravida and parity in relation to perfusion index PI as determined by one way ANOVA – mean PI by gravida {F(6,153 = 1.00), p = 0.43}, mean PI by parity {F(6,153 = 1.01), p = 0.42} as revealed by pos hoc Tamhane's T_2.

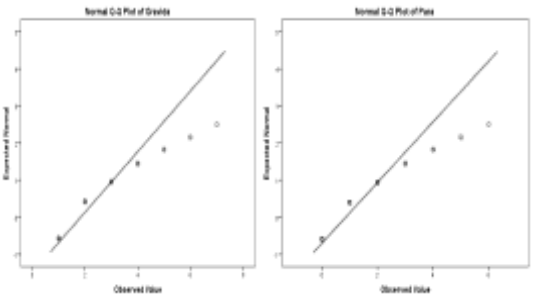

Figure 3: The trend of distribution for gravida and parity among parturient

If referred to analysis based on ANOVA for conversion and non conversion groups in association with gravida r = - 0.06, p = 0.43, p > 0.5 and parity r = - 0.06, p = 0.47, p > 0.5 obviously very clear that parity/gravida did not influence the efficacy of epidural anaesthesia.

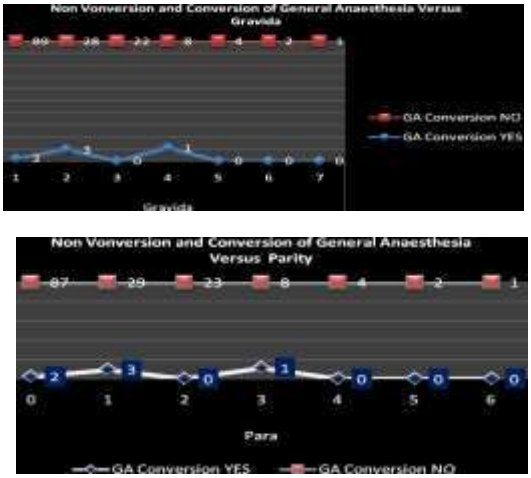

Figure 4: Gravida & Parity versus Efficacy of Epidural Anaesthesia

Mean pre gestational weight was found 71.29 ± 14.07 kg with minimum of 32 and 104 kg among parturient. For this element, successful epidural group of parturient was 71.03 ± 14.46 and for epidural conversion group was found to be 77.83 ± 9.04 kg. Looking at pre gestational mean height, it was found 1.55 ± 0.08 with minimum of 1.29 and 1.83 meters (m). The mean pre gestational height for successful epidural group was 1.55 ± 0.08 and for the epidural conversion group was 1.56 ± 0.07. The mean pre gestational body mass index BMI among parturient was 29.85 ± 6.09 kg/m^2. With this it was found that the minimum and maximum BMI were 14.81 and 51.68 kg/m^2 respectively. The mean pre gestational BMI for successful epidural group was 29.76 ± 6.11 kg/m^2 and for conversion epidural group 32.30 ± 5.44 kg/m^2. Figure 5 demonstrated the pattern of mean perfusion index PI in relation to body mass index BMI. Based on Pearson's correlation bivariate analysis it was found r = - 0.09, p = 0.27, P > 0.05 indicated body mass index did not influenced perfusion index.

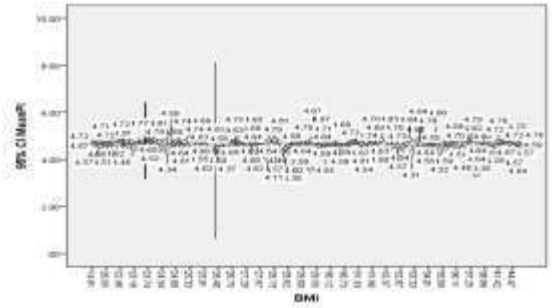

Figure 5: Pattern of Perfusion index PI in relation to body mass index BMI

The mean epidural needle inserted was 4.45 ± 0.75 cm with minimum of 4.00 and maximum of 10.00 cm. The mean epidural needle insertion for successful group was 4.45 ± 0.76 and for epidural conversion group 4.50 ± 0.45 cm. We analysed the depth of epidural needle insertion between the two groups using Independent T Test (refer Table 1). However there was no significant different when $\{t\ (158) = 0.17, (p = 0.87, p > 0.05)\}$.

Table 1: Group Statistic in Reference to Epidural Needle Insertion between Non Conversion and Conversion Groups

Group Statistics						
	GA Conversion	n	Mean	t	df	*p*
Catheter Needle Inserted	YES	6	4.50	0.17	158	0.87
	NO	154	4.45			

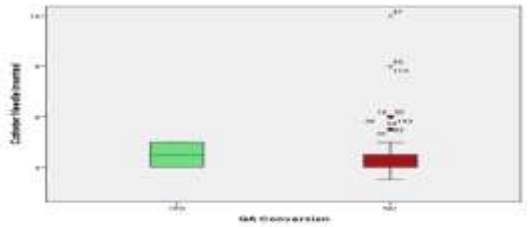

Figure 6: Box Plot for the Depth of Epidural Needle Insertion between Non Conversion and Conversion Groups

The method of bilateral somatosensory block evaluation two minutes interval applied to for the assessment of effectiveness of epidural anaesthesia. Pin prick was the common technique applied as such for the successful epidural anaesthesia n = 77 (48.1%) and for the epidural anaesthesia failure n = 6 (3.8%). At this particular issue, seventy five parturient (n = 75, 46.9%) was not applied with any technique to assess the effectiveness of epidural anaesthesia. Ethyl Chloride Spray n = 1 (0.6%) and fine touch with cotton n = 1 (0.6%) were applied for the successful group of epidural anaesthesia. Ethyl Chloride Spray and fine touch with cotton were not applied for the epidural anaesthesia failure group. Based on Chi Square test we found that the four methods of somatosensory assessment were not equally attractive for best methods as; $\chi^2(3) = 5.78$, $p = 0.12$. In other words there was no significant difference in using the three methods for the somatosensory assessment in epidural anaesthesia.

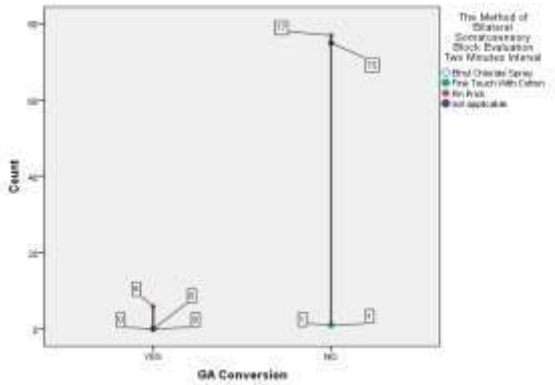

Figure 7: Somatosensory Assessment for Effectiveness of Epidural Anaesthesia

Pain was evaluated by using a 0 - 10 Visual Analogue Scale VAS (Refer Figure 8). Majority of parturient n = 136 (85.0%) in successful group epidural anaesthesia attained Scale 1 for VAS. It was followed by attaining Scale 2 of VAS (n = 18, 11.2%) for successful group epidural anaesthesia and nil of parturient attained Scale 3 for this successful epidural anaesthesia group. For epidural anaesthesia failure group, one parturient (0.6%) attained Scale 1, one parturient (0.6%) attained Scale 2 and four parturient (2.6%) attained Scale 3. It was revealed that quite significant that Visual Analogue Scale influence the successful or failure of epidural anaesthesia based on $\chi^2(2) = 106.23$, p = 0.00 giving a positive correlation. Thus VAS was a useful tool for the pain assessment in LSCS surgery

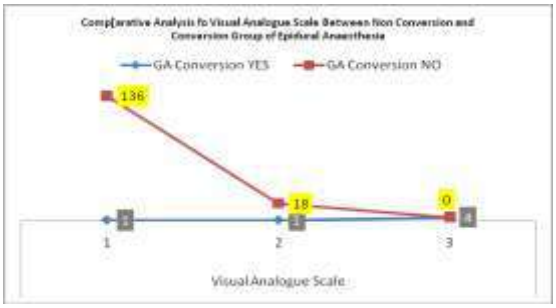

Figure 8: The Trend of VAS

Mean perfusion index PI as indicated by figure 9 below demostrated that at VAS 1 & VAS 2, the perfusion index was 4.64 and 4.60 respectedly. At VAS 3, the perfusion index 4.12 was quite low as compared to VAS 1 and VAS 2. A robust test for equality of means perfusion index PI well distributed as culculated using Waller Duncan for homogenity. With this fenomenom, it was by ANOVA plot that a good graphic pattern to see perfusion index PI was very realistic when VAS 1 mapped with mean perfusion index PI 4.64. We all believed that as the pain decreased, the perfusion index increased. As such it was revealed in this study that when pain decreased with epidural anaesthesia, perfusion index increased. Unfortunately, Spearman's coefficient was – 0.03 with $p > 0.05$, $p = 0.69$ by non parametric test. There fore, in this study, VAS did not influenced the reading of perfusion index PI eventhough the pattern shown decreased the VAS value, increasing the perfusion index PI value.

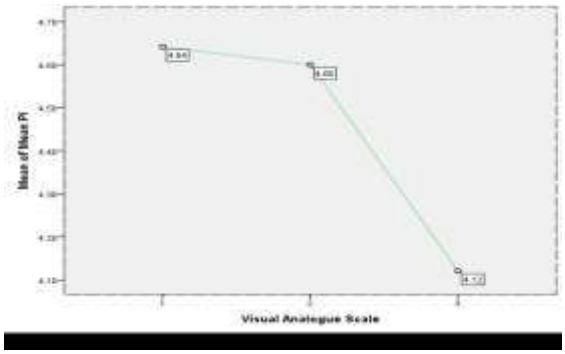

Figure 9: The Relationship of Perfusion Index with Visual Analogue Scale VAS

Bromage score based on four grade criteria degree of block right and left lower limb were analysed. For the right lower limb, number of parturient in successful group of epidural anaesthesia (n = 94, 58.7%) achieved free movement of leg and foot and n = 2 (1.3%) for the failed epidural anaesthesia group. Second criteria that was just able to flex knee with free movement of right foot n = 10 (6.2%) achieved this criteria for the successful group of epidural anaesthesia and n = 2 (1.3%) achieved this criteria for the group of failure epidural anaesthesia. The third criteria of Bromage scale for the right lower limb, it was found n = 4 (2.5%) achieved the level of unable to flex knee but with free movement of foot for the successful group of epidural anaesthesia and n = 1 (0.6%) for the epidural anaesthesia failure group. The fourth criteria of Bromage scale for the right lower limb, the number of parturient in successful group of epidural anaesthesia n = 46 (28.8%) achieved unable to move leg or foot and n = 1 (0.6%) in epidural anaesthesia failure group achieved unable to move leg or foot. We were also not sure why perfusion index (4.61) slightly lowered at the grade III (Unable to flex right knees, but with free movement of right feet) with almost 66.0% block. At this particular junction, it was clearly that degree of block did not affect the reading of perfusion index PI. Furthermore, there was no literature discussed this particular area in anaesthesia discipline.

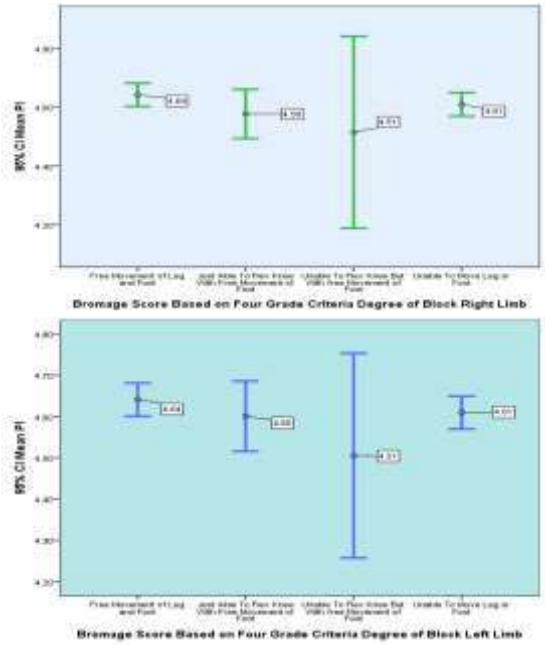

Figure 10: Pattern of Perfusion Index in Relation to Bromage Scale (Right Limb & Lower Limb)

For the left lower limb, number of parturient in successful group of epidural anaesthesia (n = 93, 58.0%) achieved free movement of leg and foot and n = 2 (1.3%) for the failed epidural anaesthesia group. Second criteria that was just able to flex knee with free movement of left foot n = 10 (6.3%) achieved this criteria for the successful group of epidural anaesthesia and n = 2 (1.3%) achieved this criteria for the group of failure epidural anaesthesia. The third criteria of Bromage scale for the right lower limb, it was found n = 5 (3.1%) achieved the level of unable to flex knee but with free movement of foot for the successful group of epidural anaesthesia and n = 1 (0.6%) for the epidural anaesthesia failure group. The fourth criteria of Bromage scale for the right lower limb, the number of parturient in successful group of epidural anaesthesia n = 46 (28.8%) achieved unable to move leg or foot and n = 1 (0.6%) in epidural anaesthesia failure group achieved unable to move leg or foot. The p value of 0.02 Bromage score based on four grade criteria

degree of block right limb among parturient demonstrated significant difference. Similarly the p value of 0.03 Bromage score based on four grade criteria degree of block left limb among parturient demonstrated significant difference. Similarly we were also not sure why perfusion index (4.61) slightly lower at the grade III (Unable to flex left knees, but with free movement of left feet) with almost complete 66.0% block compared to Bromage scale grade 1 with chatacteristic of 0.0% block. For overall perspective, regarding Bromage scale in relation to perfusion index PI unaffected by lower extremities involvement of degree of block. Overall perspective we optimistic that the perfect epidural anaesthesia effectiveness provided a phenomenon of completed pain relief without motor block as based on our own experiences.

With sensory height of T 10 - T 8 with pin prick testing became questionable as at this height still epidural failure occurred. It was among paturient with sensory height of between of between T 12 - T 11 and T 7 – T 6 required no conversion to general anaesthesia. The study done by Simiyu (2015) on regional anaesthesia covering the aspect of epidural anaesthesia addressed that conversion rates among patients with sensory height less than T5 was 11 (6.2%). Whereas among parturient with sensory height of between of between T5 and T10 it was 16 (4.4%). While those with sensory height of more than T10 was 4 (12.5%). This finding could not support our result as contrary with finding. There was no statistical significance (Chi-square test p - value = 0.13) in conversion rates among patient's sensory height. Conversion occurred in patients who had adequate block at first mainly as a result of prolonged surgery. In our setting we had similar opinion with Simiyu (2015) that no statistical significance (Chi-square test p-value = 0.19) in conversion rates among patient's sensory height. Anova test also revealed that sensory high block (dermatome assessment) did not influenced the reading perfusion index PI as F statistic was 1.03 (df = 2) and *p* value = 0.36.

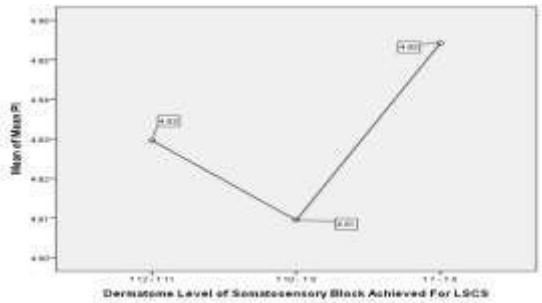

Figure 11: Dermatome Level of Somatosensory Block Achieved For LSCS in Relation to Perfusion Index

What was observed, the mean parturient temperature 36.54^{o} C slightly higher at Dermatome Level of Somatosensory T10 – T8 block achieved for LSCS surgery. It was believed that, signs of successful lumbar epidural anaesthesia block included an increasing in skin/cutaneous temperature plus sympathetic nervous system consequences beside a drop in arterial blood pressure including heaviness of lower extremities. As observed in Figure 12, it was noted that the GA conversion (lumbar epidural anaesthesia failure) occurred among parturient (n = 6) achieved dermatome level of somatosensory block T10 – T8 with mean temperature of 36.54^{0} C which considered slightly hypothermia stage. Element of proceeding to hypothermia stage had been observed during our study of lumbar epidural anaesthesia performed for LSCS surgery.

		Dermatome Level of Somatosensory Block Achieved For LSCS		
		T 12 - T 11	T 10 - T 8	T 7 - T 6
GA Conversion	YES	0	6	0
	NO	7	99	48
Total		7	105	48

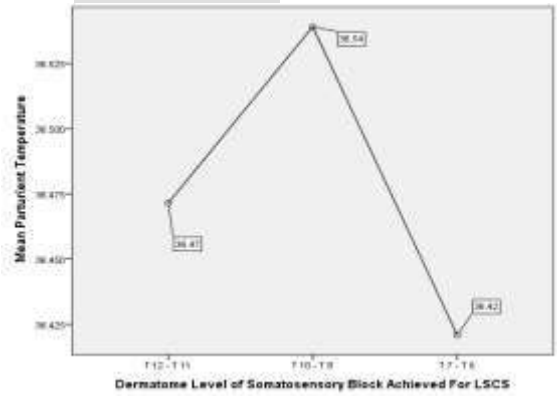

Figure 12: Dermatome Level of Somatosensory Block Achieved For LSCS in Relation to Mean Temperature

IV. CONCLUSION

It was an expectation that low rates of conversion of labour epidural anaesthesia to general anaesthesia GA for caesarean section occured. While conversion of epidural anaesthesia to general anaesthesia GA implied an inadequate labour anaesthesia and reliable assessment of adequacy of surgical anaesthesia was necessary. It was hoped that perfusion index PI monitoring would warrant further exploration for other clinical anaesthesia applications where information on peripheral perfusion or circulatory status would be useful as predictor for efficacy of epidural

anaesthesia. The traditional belief of predictor including element of visual analogue scale VAS still existed as main predictor for lumbar epidural anaesthesia failure together with assessment using Bromage scale. Some technical factors also expected to increase the primary and secondary success rate. Perfusion Index could be considered as a technical tool available and had sufficient accuracy and predictability with a growing evidence-base to justify evaluating sympathetic tone or responsiveness in clinical anaesthesia practice. There was a gap at 23.2% for epidural failure when Hermanides et al (2012) described 27.0% for lumbar epidural and our study came out with the small rate of 3.8% among parturient undergoing LSCS surgery. Therefore, perfusion index PI could not be used as indicator for Somatosensory assessment in such as Bromage scale, Visual Analogue Scale and Dermatome level.

V. RECOMMENDATION

Future direction Technologic advances should be used as way to predict epidural failure rather than using common modalities testing including light touch with cotton wool and monofilament and cold sensation. Transcutaneous Electrical Nerve Stimulation (TENS) should be used rather than using pin prick and fine touch with cotton for epidural effectiveness testing. Ultrasound imaging of the spine had recently been proposed to facilitate identification of the epidural space and predict difficult spine score, especially in parturient with abnormal lumbosacral anatomy (scoliosis) and those who were obese. It should be a good level of success in the ultrasound-determined insertion point and very good agreement between ultrasound depth (UD) and needle depth (ND). There for we would like to propose ultrasound single-screen method, using the transverse approach, could be a reliable guide to facilitate labour epidural insertion. Thus, the epidural failure rate could be minimized in parturient with difficult backbone or spine.

LIMITATION OF THE STUDY

We could not have nerve stimulator something like Transcutaneous Electrical Nerve Stimulation (TENS) and ultrasound guided regional anesthesia techniques in order to reduce migration epidural needle during lower segment caesarean section LSCS surgery. It was supposed to reduce the risk of epidural failure and increase the benefits of this kind of lumbar epidural anaesthesia.

REFERENCES

1. *ACOG Committee Opinion (2017). No. 687: Approaches to Limit Intervention During Labor and Birth. Obstet Gynecol, 129(2), e20-e28*
2. *Agaram R, Douglas MJ, McTaggart RA, Gunka V: Inadequate Pain Relief With Labor Epidurals: A Multivariate Analysis Of Associated Factors. Int J Obstet Anesth; Jan 2009, 18:(1):10-4.*
3. *Aiken C E et al (2015) Maternal and fetal outcomes following unplanned conversion to general anesthetic at elective cesarean section Journal of Perinatology 35, 695-699*
4. *Aiken, C.E et al (2015) Maternal And Fetal Outcomes Following Unplanned Conversion To General Anesthetic At Elective Cesarean Section Journal of Perinatology 35, pp 695-699*
5. *American Society of Anesthesiologists ASA (2012 'Ancient dream' of pain-free labor for Chinese women becoming closer to reality Science Daily October 13, 2012*
6. *Asato F, Takenami T: The detection of successful epidural blockade by subjective assessment of toe, Anesthesiology 11 1997, Vol.87, 1264.*
7. *Atkinson RS et al (1993): Spinal analgesia: intradural and extradural, Lee's Synopsis of Anaesthesia, 11th edition. London, Butterworth-Heinemann Ltd, 1993, pp 691–745*
8. *Baeur, A et al 2012) Recent Advances in Epidural Analgesia, Anesthesiology Research and Practice Volume 2012 (Article ID 309219, pp 14*
9. *Bannister-Tyrrell, M., Ford, J. B., Morris, J. M., & Roberts, C. L. (2014). Epidural analgesia in labour and risk of caesarean delivery. Paediatr Perinat Epidemiol, 28(5), 400-411.*
10. *Zifeng Xu et al (2017), "Differential Roles of the Right and Left Toe Perfusion Index in Predicting the Incidence of Postspinal Hypotension during Cesarean Delivery," Anesthesia and Analgesia, vol. 125, no. 5, pp. 1560–1566, 2017.*
11. *Carvalho, B and Mhyre, J. M (2016) Moving Beyond the 0–10 Scale for Labor Pain Measurement International Anesthesia Research Society December 2016 • Volume 123 • Number 6*
12. *Catarci, S et al (2016) Combined spinal-epidural anesthesia for urgent cesarean section in a parturient with a single ventricle: a case report Korean J Anesthesiol. 2016 Dec;69(6):632-634.*
13. *Chatmongkolchart, S & Prathep,S (2013) Supplemental oxygen for caesarean section during regional anaesthesia retrieved, July 30, 2017 from https://www.researchgate.net*
14. *Chen, R. et al (2013) Pregnant women's awareness and acceptance of epidural anesthesia and its influence on cesarean section rate control in China: A qualitative study. Health, 5, 1455-1460.*
15. *Chia, H H et al (2015) A comparison of spinal and epidural anesthesia for cesarean section following epidural labor analgesia: A retrospective cohort study Acta Anaesthesiologica Taiwanica 53 (2015) 7e11*
16. *Chih, K.S et al (2012) Soft catheters reduce the risk of intravascular cannulation during epidural block—a retrospective analysis of 1,117 Cases In A Medical Center Kaohsiung Journal of Medical Sciences 2012, 28 (7): 373-6*

17. Chuan-bao, H et al (2012) Effects of preloading epidural space with epinephrine (1:200 000) on the incidence of vascular injuries through the insertion of an epidural catheter during cesarean section Chinese Medical Journal 2012 August 21, 92 (31): 2195-7
18. Cochrane Database of Systematic Review (2005) About Analgesia And Recent Advances as cited in Danilack, V, A et al (2015) The effect of labour induction on the risk of caesarean delivery: using propensity scores to control confounding by indication British Journal of Obstetric and Gynaecology. 2014 September 1471-0528.13682
19. Dresner M, Brocklesby J, Bamber J. Audit of the influence of body mass index on the performance Anaesthesiol Clin Pharmacol. Jan-Mar; 33(1): pp 16–27.
20. Elsharkawy, H et al (2017) Localization of epidural space: A Review Of Available Technologies Journal of Anaesthesiology Clinical Pharmacology 33(1):16 · January 2017
21. Hea, J. Y and Seung, I. P (2015) The Relationship Of Preoperative Anxiety With Failure Of Extension Of Epidural Analgesia For Cesarean Section Anesth Pain Med 2015;10(4): pp 271-7
22. Heesen M et al (2013). Is general anaesthesia for caesarean section associated with postpartum haemorrhage? Systematic review and meta-analysis. Acta Anaesthesiol Scand. 2013;57:1092–102.
23. Heinink, T.P et al (2015) The effect of anaesthetist grade and frequency of insertion on epidural failure: a service evaluation in a United Kingdom teaching hospital BMC Anesthesiology BMC Anesthesiology 2015
24. Helwick, C (2009) Obesity Not a Risk Factor for Epidural Failure in Cesarean Delivery American Society of Anesthesiologists (ASA) 2009 Annual Meeting
25. Hermanides, J et al (2012) Failed epidural: Causes And Management Br J Anaesth 2012; 109: pp 144-54
26. Ho-Shiang H et al (2014) erfusion Index Derived from a Pulse Oximeter Can Detect Changes in Peripheral Microcirculation during Uretero-Renal-Scopy Stone Manipulation (URS-SM) retrieved December 26, from 2014https://doi.org/10.1371/journal.pone.0115743
27. Jordan H, et al Massive maternal obesity and perioperative cesarean morbidity. American Journal of Obstetrics and Gynecology Volume 170, Issue 2, February 1994, Pages 560-565
28. Kakazu C, Z et al (2005). Masimo set technology using perfusion index is a sensitive indicator for epidural onset. Anesthesiology. 2005;103:A576
29. Kathuria TS & Sapkal R (2016) Audit of caesarean section for non-progress of labor. Int J Reprod Contracept Obstet Gynecol. 2016 Apr;5(4):1002-1005
30. Kuthiala, G and Chaudhary, G (2016) Ropivacaine: A review of its pharmacology and clinical use: Indian Journal Anaesthesia. 2011 Mar-Apr; 55(2): 104–110
31. Le Tagaloa, L.A et al (2009) A Survey of Perioperative and Postoperative Anesthetic Practices for Cesarean Delivery Anesthesiology Research and Practice Volume 2009 (2009), Article ID 510642, pp 7
32. Lima, A.P.1 et al (2002) Use Of A Peripheral Perfusion Index Derived From The Pulse Oximetry Signal As A Noninvasive Indicator Of Perfusion Crit Care Med. 2002 Jun;30(6):1210-3.
33. Lirk, P. (2014). Local anesthetics: New insights into risks and benefits The institutional Repository of the University of Amsterdam (UvA)
34. Lucas, D.N et al (2000) Urgency of caesarean section: a new classification. Journal Royal Society Medicine 2000;93:346–350
35. Michelle J.K. et al (2011) Epidural and Spinal Anesthesia Use During Labor: 27-state Reporting Area, 2008 National Vital Statistics Reports Volume 59, Number 5 April
36. Mishra P et al (2015) Comparative Evaluation of Bupivacaine Versus Ropivacaine Epidurally in Obstetrical Surgeries (LSCS): A Clinical Study. Journal of Medical Science And Clinical Research Volume 3 Issue 08 August 2015
37. Morris T, Schulman M. (2014) Race Inequality In Epidural Use And Regional Anesthesia Failure In Labor And Birth: An Examination Of Women's Experience. Sex Reprod Healthc. 2014;5:188–194
38. Mupuri, R et al (2012) Predictive Model For The Inadequate Labour Epidural Analgesia: An Outcome of The Prospective Observational Study at University Women's Hospital M.E.J. Anesth 21 (5),
39. Okojie, N. Q and Isah, E.C (2014) Perception Of Epidural Analgesia For Labour Among Pregnant Women In A Nigerian Tertiary Hospital Setting Journal of West African College Surgery. 2014 Oct-Dec; 4(4): 142–162
40. Peduto V,A et al (1994): Pulse oximetry during lumbar epidural anesthesia: reliability of values measured at the hand and the foot. Anesth Analg 1994; 78: 921-4.
41. Prabhat et al (1999) Plethysmographic Pulse Oximeter Waveform Variation as an Indicator of Successful Epidural Blockade: A Prospective Study, Anesthesiology 9 1999, Vol.91, 899
42. Purva, M., et al. (2012), Conversion from regional to general anaesthesia for caesarean section: are we meeting the standards?. Anaesthesia, 67: 1278–1279.
43. Robert A. (2008) Maternal Hemodynamic Monitoring in Obstetric Anesthesia Anesthesiology 11 2008, Vol.109, 765-767
44. Rodrigues, F. R & Nascimento Brandão, M.J (2011) Regional Anesthesia for Cesarean Section in Obese Pregnant Women: A Retrospective Study Revista Brasileira de Anestesiologia 2011; 61: 1: 13-20
45. Ružman, T et al (2014) Factors associated with difficult neuraxial blockade Local Reg Anesth. 2014; 7: pp 47–52.
46. Samina Ismail et al (2015) Incidence of cesarean section and analysis of risk factors for failed conversion of labor epidural to surgical anesthesia: A prospective, observational study in a tertiary care center J Anaesthesiol Clin Pharmacol. 2015 Oct-Dec; 31(4): 535–541
47. Sen, S et al (2016) Epidural anesthesia: A safe option for cesarean section in parturient with severe pulmonary

hypertension Journal National Science Biololgy Medicine. 2016 Jul-Dec; 7(2): 182–185.

48. *Sengar, S & Ohary, R (2016) Observation on Effects of Lumbar Epidural Analgesia for Painless Labor International Journal of Scientific Study | March 2016 | Vol 3 | Issue 12*
49. *Speights, K (2017) Masimo Corporation Reports Solid Q4 With Growing Pulse Oximeter Sales Successful Epidural Blockade: A Prospective Study Anesthesiology 9 1999, Vol.91, 899.*
50. *Stark, M. A (2003) Exploring Women's Preferences for Labor Epidural Analgesia Journal of Perinatal Education. 2003 Spring; 12(2): 16–21*
51. *Thangamuthu, A et al (2013) Epidural failure rate using a standardised definition. Int. J. Obstet. Anesth. 2013;22:310–315.*
52. *The American Society of Anesthesiologists ASA, Practice Guidelines for Obstetric Anesthesia Anesthesiology 2016; 124:00-00*
53. *The Royal College of Anaesthetists (2009) Mei, 7th 2016 retrieved from www.rcoa.ac.uk*
54. *Tonidandel, A et al (2014):Anaesthetic and obstetric outcomes in morbidly obese parturients:20 year follow-up retrospective cohort study.International Journal Obstetric Anesthetsia November 2014 Volume 23, Issue 4, Pages 357–364*
55. *Trout, K.K (2004) The Neuromatrix Theory Of Pain: Implications For Selected Nonpharmacologic Methods Of Pain Relief For Labor Journal of Midwifery & Women's Health Volume 49, Issue 6, November–December 2004, pp 482–488*
56. *Uemura A et al (2006) Pulse Oximeter Perfusion Index as a Predicator for the Effect of Pediatric Anesthesiology. 2006;105:A1354.*
57. *Wiedersehn, S (2017) Link between obesity and failed epidurals Australian Associated Press May 15, 2017*
58. *Wood, S.1 et al (2014) Does Induction Of Labour Increase the Risk Of Caesarean Section? A Systematic Review And Meta-Analysis Of Trials In Women With Intact Membranes. British Journal of Obstetric and Gynaecology. 2014 ;121(6):674-85;*
59. *World Federation of Societies of Anaesthesiologists (2001) WFSA Advocacy Programme as cited in Debas, H. T., P. et al (2015). Essential Surgery. Disease Control Priorities, third edition, volume 1. Washington, DC: World Bank.*
60. *Xiaofei Q et al (2016) Anesthesia management for cesarean section 10 years after heart transplantation: a case report Springer Plus 20165:993*
61. *Xue et al (1996) Effect of epidural block on the lag time of pulse oximeter response Anaesthesia 51 (12), 1102-1105. 12*
62. *Zifeng X et al (2013) Assessment of Pulse Oximeter Perfusion Index in Pediatric Caudal Block Under Basal Ketamine Anesthesia Scientific World Journal. 2013; 2013: 183493.*