International Journal of Sciences: Basic and Applied Research (IJSBAR)

ISSN 2307-4531
(Print & Online)

http://gssrr.org/index.php?journal=JournalOfBasicAndApplied

Effect of Intrathecal Labor Analgesia (ILA) in Normal Labor Study on the Dynamics of Pain Intensity and Level of Prostaglandin (PGE2) Maternal Plasma

Hubertus Okky Oktafandi[a*], Nita Ratna Dewanti[b], Husni A Tanra[c], Ilham Jaya Patellongi[d], Maisuri Chalid[e]

[a]*Medical Science of Postgraduate Program, Faculty of Medicine, Hasanuddin University, Makassar, Indonesia; Obstetric Department, Premier Bintaro Hospital, Jakarta, Indonesia*

[b,c,d,e]*Faculty of Medicine, Hasanuddin University, Makassar, Indonesia*

Email: oktafandhi@gmail.com

Abstract

The aim of the study is to examine the dynamics of pain intensity and level of prostaglandine maternal plasma in painless labour using intratechal labour analgesia. Methods of this study used a prospective cohort study of 77 parturient delivered in Bintaro Hospital and Archa Medika Hospital, Jakarta Indonesia was performed from January to June 2015. Parturient women chose whether they preferred painless labour using ILA to normal delivery without analgesia (NDWA). Fentanly 25 ug, bupivacaine 2,5 mg and clonidine 0,045 ug were administered through intrathecal as ILA. Pain intensity was recorded by the parturient on a visual analogue scale. Level of prostaglandine measured in 4 consecutive time. Obstetric parameters were followed and recorded, Apgar score were noted, and all the results were compared in the two groups. Result show a total of 77 parturients were included in the study, of whom 41 mother who is received ILA as painless labour, while 36 mother without any analgesia. Maternal characteristics were homogenously distributed in both groups (ILA and non-ILA groups). In both nulipara and multipara parturients ILA group, visual analogue score were higher (9.4 /8.9) compared to non ILA group (5.9/5.6).

---

* Corresponding author.

After 5 minutes of ILA placement and ILA group VAS (2.1/2.2) lower than non ILA group (7.6/6.9). At the time of fully dilated cervix (stage II) in ILA group VAS (1.8/3.7) much lower than non ILA group (7.7/7.2). All the previous result is statistically significant (P 0.001). Prostaglandin Level. In nuripara prostaglandin level in ILA group after 5 minutes ILA placement were lower than non ILA group but in multipara prostaglandin level total were lower in ILA group compared to non ILA. In conclusions, Painless labour using intrathechal analgesia (ILA) is a safe choice for parturient women with low pain tolerance. Therefore, this will have reducing tissue damage for birth canal.

***Keywords*:** Painless labour; intrathecal labour analgesia; prostaglandin; VAS.

1. Introduction

Pain is a protection alarm tells the body that there is a damaged tissue that seek help. Similarly, the labor pains were originally an alarm to tell the mother that the baby is coming out (the delivery process has started). Every woman wants her labor went smoothly and can give birth to a baby perfectly. Labor could walk normally, it is not uncommon to experience labor constraints and have to do with the operation [1]. But the pain that is felt by mother can be stressful for the mother, which can affect the performance of the newborn. Maternal tolerance to pain are often influential in the decision to grant analgesia during labor is not uncommon even choose to do sectio caesaria operation that actually can be avoided. Maternal stress also can trigger a hormonal response such as increased secretion of epinephrine, norepinephrine [2, 3]. There are various techniques minimal labor pains were already known, but the most popular is the epidural technique (ELA) and lumbar intrathecal analgesia techniques (ILA). Of the two techniques above technique Labour Epidural Analgesia (ELA), which is more popular, but the cost is more expensive and more complex implementation procedures. On the other hand intrathecal technique Labour Analgesia (ILA) is cheap, simple and easy procedure, but there are also drawbacks, namely a short duration of action ILA (limited), so this technique is not popular.

Some parameters of the stress of labor resulting pain and tissue damage described by plasma catecholamines, namely adrenaline and nor adrenaline. The occurrence of pain among others, triggered by changes in plasma prostaglandin produced by the mother and fetus. With the increase in pain then until today cortisol is still considered a fairly good parameter to indicate the level of stress at the time of delivery. Data from hospitals Premier Bintaro obtained from medical records over the last six months (October to March 2014), all deliveries are 411, with 118 (28.71%) of spontaneous labor without ILA, 32 (7.79%) deliveries with vacuum extraction , 173 (42.1%) and SC 88 (21:41%) deliveries with the ILA. At Archa RS Medika, of total deliveries during the last 6 months there were 71 (63.4%) SC, 36 (32.14%) deliveries with ILA and only 5 (4:47%) deliveries without ILA. Figures labor by ILA at both hospitals are still showing a low level use of ILA among Obstetrics because of ignorance and fear using the method of delivery to the ILA. Based on the foregoing, it is necessary to do studies looking at the dynamics of these parameters, so that the safety and effectiveness of the technique can be proven. Study of ILA is expected to provide objective data and instructions, implementation of minimum labor pains are easy to do, effective and safe. The purpose of this study was to analyses the impact of labor using intrathecal labor analgesia on intensity labor pain, as well as the dynamics of the levels of prostaglandins which is a marker of pain and tissue damage [4,5].

2. Materials and Methods

This study is a prospective cohort study that was conducted at the Premier Bintaro hospital Tangerang and Archa Medica hospital, Bumi Serpong Damai Tangerang. Research was done from January to June, 2015. Subjects were mothers who use minimal pain ILA labor and childbirth without ILA in Premier Bintaro hospital and Archa Medica hospital in the period of the study. Subjects taken by consecutive sampling until they reach the required number. Inclusion criteria: mothers 25-40 years of age, gestational age at term (37-42 weeks), the estimated weight infants 2500-4000 grams. At the opening of 4-5 cm primigravida achieve while in multiparas opening of 5-6 cm. labor not encountered complications such as DSP (cephalopelvic disproportion), body mass index less than 30, according to the category of non obesity. Agree to participate in the study and signed a consent letter. Then, the exclusion criteria included: birth mothers receive anaesthetics other than ILA, there are childbirth complications such as severe preeclampsia, fetal IUGR (Intrauterine Growth Retardation). Delivery with intrathecal anesthesia is one option for reducing pain in birth mothers. Labor used intrathecal anesthesia drug mixture used in this study are:

1. Fentanil with dose of 25 ug, a dose is taken to provide analgesia was but require other drugs potential to produce complete pain relief effect. The fentanyl dose associated with minimal side effects. It is anticipated also that this dose still has minimal side effects even combined the two drugs were involved in this study.

2. Bupivacaine has a good binding protein and a long duration, is often used as a local anaesthetic in the epidural analgesia for obstetric cases. Bolus of 2.5 mg spinal bupivacaine will cause a rapid onset of analgesia and maintaining good for 30-60 minutes.

3. Clonidine: an alpha-2-agonist more selective than the adrenaline. Clonidine enhance the effects of opioids, without respiratory depression, pruritus or nausea. Need to watch the effects of hypotension, bradycardia and sedation might cause. Clonidine dose used 0,045 ug entirely inserted into the syringe and diluted with NaCl 0.9% to 3 cc. Doses of these drugs is low for the use of intrathecal anesthesia compared to epidural requiring higher doses.

3. Research Results

This research was conducted in Premier Bintaro hospital and BSD Tangerang RSIA Archa Clinic, between January and June 2015. It was found that 41 patients of 77 samples of vaginal birth without minimum pain by ILA (53.25%) and 36 patients birth vaginally without ILA (46.75%). The whole subject of the research described regarding the intent and purpose of this study, then the signing of a letter of approval as written evidence to be the subject of research.

ILA effect on VAS Mother Maternity Multipara

The results of the study determine the effects of ILA action on maternal nulliparous, that is done by comparing the analysis of VAS, adrenalin, PGE-2, and serum cortisol between ILA groups and without ILA of maternal

nulliparous, during the observation time. Comparison of the degree of pain maternal nulliparous with ILA and without ILA can be seen in the table below:

Table 1: Characteristics of mother giving birth in their respective labor group

Variables		Birth mother			P
		ILA	without ILA	Total	
Age	< 35 years	31	25	56	0,727
	≥ 35 years	10	11	21	
Gravida	Primigravida	13	10	23	0,899
	Multigravida	28	26	54	
Para	Nulipara	13	10	23	0,899
	Multipara	28	26	54	

Table 1: Comparison of the degree of pain nulliparous women giving birth between the ILA and Without ILA

Birth mother	observation time	*Mean* (SD) pain score		P
		ILA (n=13)	without ILA (n=10)	
Nulipara	Pra ILA	9,4 (0,7)	5,9 (1,4)	<0,001
	5 mnts post -ILA	2,1 (1,4)	7,6 (1,1)	<0,001
	45 mnts post -ILA	1,4 (0,9)	8,8 (0,8)	<0,001
	complete openness	1,8 (0,8)	7,7 (2,1)	<0,001
	Total	3,8 (3,6)	7,5(1,4)	<0,001

Based on the above table, it can be seen that the pain score (VAS) on a given shortly before the ILA action on maternal (pre-ILA) found differences in pain scores between birth mothers with ILA and without ILA. The degree of pain in the group of mothers with higher ILA (Mean VAS = 9.4) than the group without ILA (mean VAS = 5.9). In the group that received ILA, decreased pain scores obtained, ie at the 5^{th} minute after ILA mean VAS was 2.1 and continued to decline until the 45^{th} minute post-ILA mean VAS score = 1.4, but when the full opening of the mean value VAS increased a bit that is equal to 1.8. Meanwhile, in the group of birth mothers are not ILA, found an increase in the pain score at the 5th minute since the active phase (mean VAS = 7.6) and continues to increase up to 45 minutes of active phase (mean VAS = 8.8) and mean VAS be 7.7 when the opening is almost complete. At the time of observation points in common between the mean VAS of both groups obtained a significant difference ($p < 0.05$), after the action ILA, where the group ILA, pain scores were

lower than the group of mothers who did not do ILA. So the effect of pressing the ILA labor pain. As for the comparison of VAS maternal nulliparous with ILA and without ILA can be seen in the graph below:

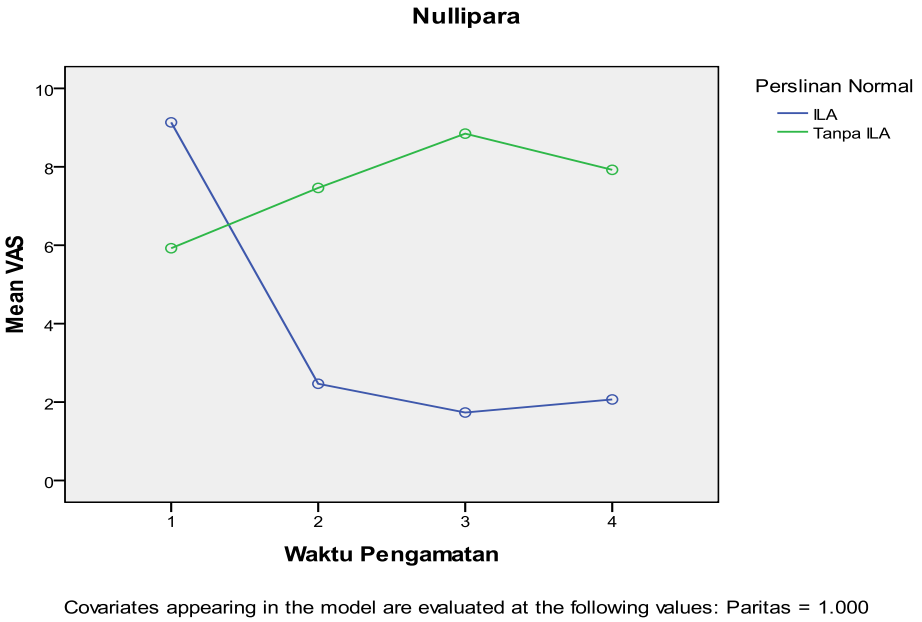

Figure 1: Comparison chart VAS nulliparous women giving birth between ILA and without ILA.

From the picture above, it can be seen the pain score were assessed immediately before the action ILA show that in the group of women giving birth nulliparous with ILA higher score of pain was compared with the group without the ILA, but the 5-minute post-ILA pain scores greatly decreased (mean VAS approach 2) and increased slightly ahead of the full opening phase. Meanwhile, on the graph VAS in the group without ILA is very much increased (approaching mean VAS = 9) ahead of the full opening.

Effects of the VAS Mother Maternity ILA Multipara

The results of the study determine the effect of the action on maternal multiparas ILA, is done by comparing the analysis of VAS, adrenalin, PGE-2, and serum cortisol between groups ILA and Without ILA (normal delivery) of maternal multiparous, during the observation time.

Comparison of the degree of pain maternal multiparous with ILA and without ILA can be seen in the table below:

On table, it can be seen that the pain score (VAS) on a given shortly before the ILA action on maternal (pre-ILA) found differences in pain scores between birth mothers with ILA and without ILA. Degrees of pain in the group of mothers with higher ILA (Mean VAS = 8.9) than the group without ILA (mean VAS = 5.6). In the group that received ILA, pain scores decreased; one being the mean VAS 2.2 on the 5th minute after the ILA and continued to decline until the 45th minute post-ILA (mean VAS = 1.4), and then increased slightly at the

opening of the complete (mean VAS = 3.7). Meanwhile, in the group of women giving birth without the ILA (normal delivery), found an increase in pain score at the 5th minute since the active phase (mean VAS = 6.9) and continues to increase up to 45 minutes of active phase (mean VAS = 8.2) and become mean VAS = 7.2 when opening almost complete. At the time of observation points in common between the mean VAS was significantly different between the two groups (p <0.05), after the action ILA, where the group ILA, pain scores were lower than normal birth mothers group. So the effect of pressing the ILA labor pain.

Table 2: Comparison of pain intensity between groups multiparas maternal ILA and Without ILA

Birth mother	observation time	*Mean*(SD) pain score		P
		ILA (n=28)	without ILA (n=26)	
Multipara	Pra ILA	8,9(0,7)	5,6(1,2)	<0,001
	5 minutes Post -ILA	2,2(2,1)	6,9(1,3)	<0,001
	45 minutes Post -ILA	1,4(2,0)	8,2(0,9)	<0,001
	complete openness	3,7(3,5)	7,2(1,6)	<0,001
	Total	3,7(3,5)	7,2(1,6)	<0,001

As for the comparison of VAS maternal multiparous with and without ILA ILA can be seen in the graph below:

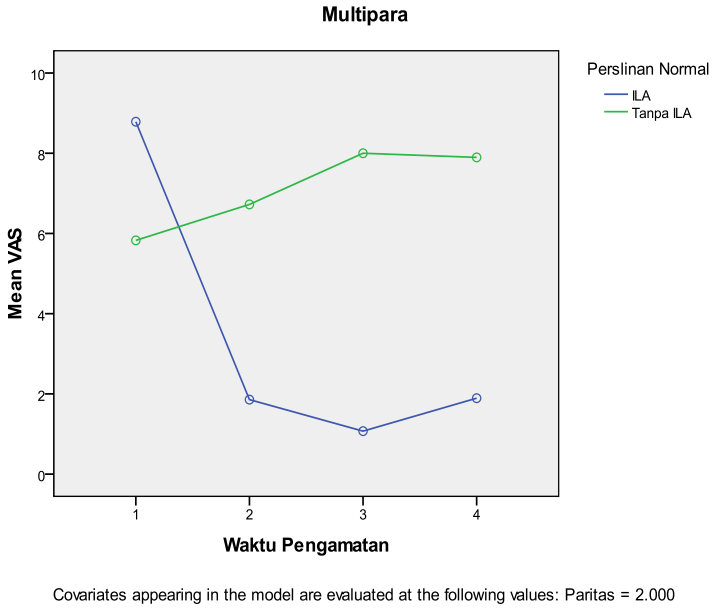

Figure 2: Comparison chart FAS multiparous mothers between the ILA and without ILA

From the above picture can be seen in pain scores were assessed immediately before the action ILA show that in the group of women giving birth multiparous with ILA higher score of pain was compared with the group without the ILA, but the 5-minute post-ILA pain scores greatly decreased (mean VAS approached 2) and increased slightly ahead of the opening phase completely. Meanwhile, on the graph VAS in the group without ILA is very much increased (approaching mean VAS = 9) ahead of the full opening. Comparison of maternal serum levels of PGE2 nulliparous with ILA and without ILA can be seen in the table below:

Table 3: Comparison of maternal serum levels of PGE2 nulliparous between the ILA and Without ILA.

Birth mother	observation time	*Mean*(SD) PGE2 serum level		P
		ILA (n=13)	without ILA (n=10)	
Nulipara	Pra ILA	3144,18(964,19)	2978,45(798,80)	0,587
	5 minutes post-ILA	3263,82(1174,77)	3570,24(789,99)	0,504
	45 minutes post –ILA	2637,82(942,32)	3527,98(847,47)	0,035
	complete openness	2722,22(810,42)	3542,23(786,00)	0,026
	Total	2942,01(926,02)	3393,21(812,90)	0,019

From the above table can be seen maternal serum levels of PGE2 nulliparous assessed shortly before tidakan ILA ILA show that in the group of PGE-2 serum levels slightly higher than the group without ILA birth mothers, but not significant ($p > 0.05$). In observation of 5 minutes active phase of the maternity without ILA, PGE-2 serum levels increase, so does the ILA groups, but the increase in the ILA group was slightly lower than the group without the ILA, although not significant ($p > 0.05$). On the eve of the opening of the current full and complete opening of PGE-2 serum levels continued to increase in both groups, but the levels of PGE-2 increased serum was significantly higher ($p < 0.05$) in the group compared to the group without ILA ILA. Thus, the effect of ILA suppress the increase in PGE-2 during persalin, especially on the eve of the opening of the current full and complete opening.

The comparison of the levels of PGE-2 maternal serum nulliparous with and without ILA ILA can be seen in the graph below:

From the picture above can be seen that the maternal nulliparous without ILA levels of PGE-2 serum increases during the active phase, while in the group of women giving birth by ILA levels of PGE-2 serum also increased slightly, lower than the increase in the group without ILA, 5 minutes ILA post, but afterwards, decreased and increased slightly during the complete opening. Thus, the ILA effect on levels of PGE-2 during persalin,

considered to reduce levels of PGE-2 during the active phase of labor. In the table below can be seen the levels of PGE-2 in maternal multiparas with and without ILA ILA:

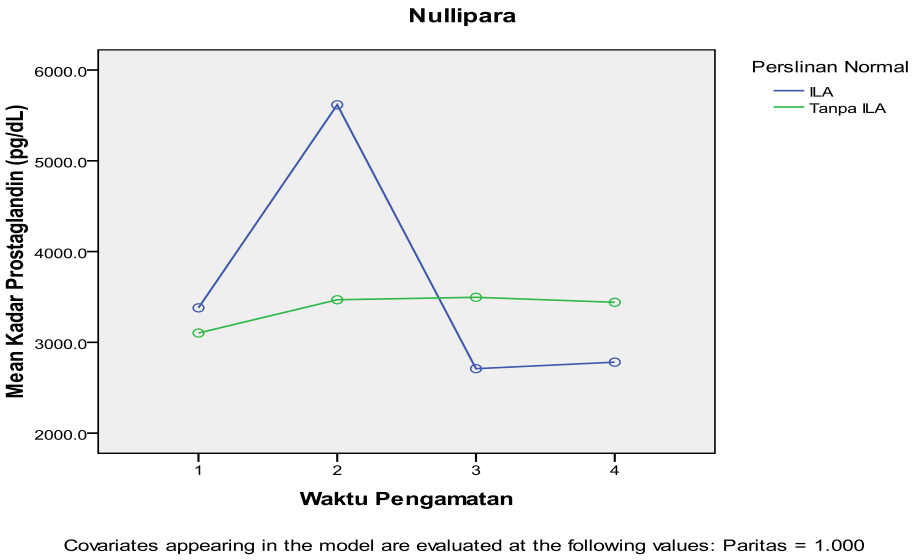

Figure 3: Comparison chart of maternal serum levels of PGE2 nulliparous between the ILA and without ILA

Table 4: Comparison of maternal serum levels of PGE2 multiparas between the ILA and Without ILA

Birth mother	observation time	*Mean*(SD) level PGE2 serum		P
		ILA (n=28)	without ILA (n=26)	
Multipara	Pra ILA	2915,37(622,10)	3103,66(867,06)	0,361
	5 mnt post -ILA	3001,63(680,20)	3463,11(657,54)	0,015
	45 mnt post -ILA	2574,82(646,59)	3586,50(714,47)	<0,001
	complete openness	2701,97(666,18)	3411,39(740,06)	0,001
	Total	2799,53(666,57)	3391,16(759,05)	<0,001

Based on the above table it can be seen that the levels of maternal serum PGE2 multiparous assessed shortly before ILA show that in the group of serum adrenaline levels are slightly lower than the group without ILA birth mothers, but not significant (p> 0.05). In observation of 5 minutes active phase of the maternity without ILA, PGE-2 serum levels increase, so does the ILA group but an increase in the ILA group was slightly lower

than the group without the ILA, and significantly ($p < 0.05$). On the eve of the complete opening of PGE-2 serum levels continued to rise without the ILA, but the ILA group tended to decrease, so that the levels of PGE-2 lower at ILA group ($p < 0.05$), as well as the complete opening. Thus, the effect of ILA suppress the increase in PGE-2 during persalin, especially on the eve of the opening of the current full and complete opening.

The comparison of the levels of PGE-2 maternal serum multiparous with ILA and without ILA can be seen in the graph below:

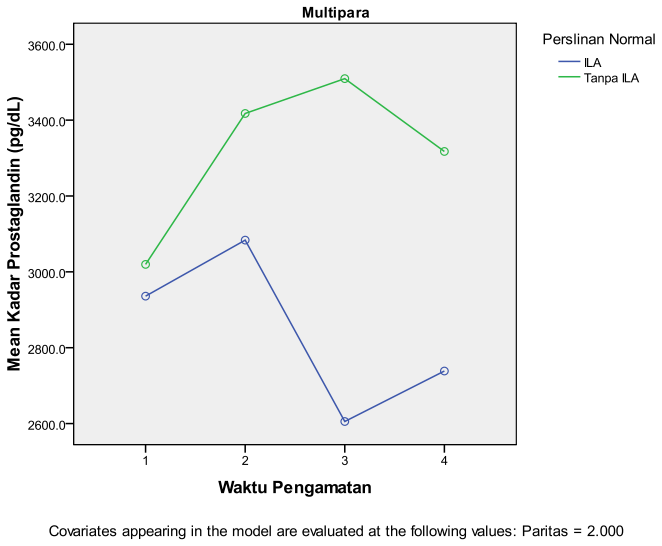

Figure 4: Comparison chart of maternal serum levels of PGE2 multiparas between the ILA and without ILA

From the above picture can be seen that maternity multiparas without ILA, levels of PGE-2 serum increases during the active phase, while in the group of women giving birth by ILA levels of PGE-2 serum also increased slightly, lower than the increase in the group without ILA, 5 minutes ILA post, but afterwards, decreased and increased slightly during the complete opening. Thus, the ILA effect on levels of PGE-2 during giving a birth, considered to reduce levels of PGE-2 during the active phase of labor.

4. Discussion

Maternity leave a response that resembles the metabolic and endocrine surgical trauma. Increased levels of ketokolamin, cortisol and ACTH, CRH, and B-endorphins. Repeated acute stress caused delays in lactation and fetal acidosis associated with maternal plasma cortisol levels. So the plasma concentrations of cortisol, adrenaline, and prostaglandins, may be used as a reflection of the response to the stress of labor. The effect of oxytocin and its role during labor are well known. Oxytocin also plays a role in the process of breastfeeding as well as the stress response. Research by [5,6] about the fear, pain, and stress hormone changes during labor showed that the dynamics of fear, pain, and stress hormone levels is strongly influenced by the administration of epidural analgesia. The relationship of fear and pain seemed more pronounced than with the relationship between stress hormones to fear, pain and the duration of labor.

A. Pain Intensity

Pain that occurs in parturition when one comes from a distended lower uterine segment and cervical dilation, as well as stretching nociceptive sensor excitation due to muscle contractions of the uterus. Then by the plain C fibers visceral nociceptive stimuli delivered through the lumbar and thoracic sympathetic chain down the nerve fibers to the posterior thoracic 10 to lumbar 1, to the synapses found in the dorsal ganglia [7]. Chemical mediators involved that bradykinin, leukotrienes, prostaglandins, serotonin, substances P and lactic acid. Along with the progress of labor pain will be delivered to the dermatomes are supplied from the T10 and L1. At parturition Kala II additional pain coming from the pull and pressure on the parietal peritoneum, the ligament of the uterus, urethra, bladder, lumbosacral plexus, rectum, fascia and muscles of the pelvic floor. When this phase of the direct suppression lowest part of the fetus to the lumbosacral plexus cause neuropathic pain. Stretching the vagina and perineum stimulating the pudendal nerve (S2,3,4) through the fiber delta A smooth, fast bermyelin and deliver stimuli. From this area impulses through the dorsal horn cells and eventually through Spino-thalamicus pathways to the brain.

This study found that, the group of mothers maternity nulliparous and multiparous get ILA, got higher pain scores given shortly before the ILA than normal group. Limamenit post-ILA greatly decreased pain scores and increased slightly ahead of the full opening phase. While VAS in normal labor group is very much increased ahead of the full opening. This incident shows that the labor pain that arises is reduced to the lowest VAS value 2. This indicates that administration of ILA does not relieve the pain VAS value equal to 0. ILA action is given at the beginning of the active phase of labor, the opening of the cervix is 4-5 cm. When mother began to feel labor pains that can be tolerated. However, at the ILA group VAS score (8-9) is currently before the ILA given much higher than the normal labor group. This suggests that the pain in the active phase is a sensation that still can be tolerated although VAS different value than the normal delivery group with an average VAS 6. When the pain is not intolerable, giving ILA immediately. This is in accordance with the needs of the mother would be the pain-reducing labor are only given at the right time. With the pain still felt ILA group until it reaches a certain value VAS expected this does not eliminate the attachment relationship between mother and child as in childbirth without ILA.

At ILA provision that has lasted for one and a half to two hours, the mother will begin to feel a stretching of the pelvic floor muscles and the pressure on the anus as a sensation for straining. This shows that the ILA group sensation of pain will not go away 100%, but it will still be there. Although the mother feel more comfortable but still led stain and gave birth to normal, as evidenced in this study did not get the whole group ILA instrumentation relief in labor. This situation cannot be separated from the preparation mothers who are given training pregnancy exercise regularly. The sensation of pain is tolerated as well as motor skills are not lost in the ILA, generating satisfaction because the mother will still feel the mother's maternity. Basically a mother does not like the condition of 100% of pain relief during labor and delivery because straining result cannot be good to give birth.

In research conducted by [8,9], found that administering intrathecal sufentanil analgesia effect is faster and stronger than in the epidural administration of bupivacaine. This study also shows that plasma cortisol levels

decreased more in patients receiving intrathecal analgesic. In addition the combination of bupivacaine and fentanyl provide analgesia was good but did not give undue influence to the plasma cortisol levels. ILA is an action that does not alter the pattern of labor. The results showed that the change is the VAS value, that there are differences in the levels of pain experienced by women giving birth by ILA and normal birth. VAS value on maternity by the ILA is much lower than labor without ILA. Based on these results, it can be concluded that this did not alter hemostasis labor but only reduces pain.

B. Levels of Prostaglandin

In nulliparous group maternal maternity normal serum levels of PGE-2 increases during the active phase, while in the group of women giving birth by ILA serum levels of PGE-2 also increased slightly, lower than the increase in the group of normal birth. At five minutes after ILA decreased consistently and will increase slightly during the complete opening. In the nulliparous mothers ILA considered the effect of lower levels of PGE-2 during the active phase of labor. This is because prostaglandins that occurs arising from tissue damage, but it was not much different from the normal delivery group is currently active phase. In the group of ILA, when the first 5 minutes before the opening levels down to complete but rise again because there is an emphasis and strain on the pelvic floor tissues. These prostaglandins play a role in softening the cervix and increases uterine contractions.

On the maternal multiparas normal group, the levels of PGE-2 serum increases during the active phase, while in the group of women giving birth by ILA levels of PGE-2 serum also increased slightly, lower than the increase in the normal group, but the 5-minute post-ILA levels decreased, but after that there was a slight increase during the complete opening. Differences multiparas with nulliparous ILA group looked only at the initial level value of prostaglandin where higher nulliparous group, but have a pattern similar to the dynamics of prostaglandin multiparas group. This is understandable because the pelvic floor tissue nulliparas have never exceeded the fetus so that destruction happens more severe. In the group of normal birth, both nulliparous and multiparous groups have a tendency to increased levels of prostaglandins. But just before the complete opening of the multi decreased levels of prostaglandins group, whereas in the nulliparous tends to increase. This is in accordance with the level of destruction that is heavier on nulliparous.

This study is aimed at the level of the safety, effectiveness and advantages of using a single dose spinal analgesia for labor pain and it is known that there is a reduction in pain intensity after administration ILA labor. It is proven that, the vas good value evaluation in nulliparous and multiparous groups, changes in pain intensity was visibly much lower than labor without ILA.

In handling labor by ILA patients (maternal) more cooperative when led meneran, this is reflected in the levels of prostaglandin which is much more stable and lower than patients without ILA labor. Ng et al showed in his study of 751 women given spinal anesthesia have higher satisfaction levels and is associated with early spinal anesthetic drugs work faster relief of pain of labor. Minty RG et al examined the safety and effectiveness of spinal analgesia for labor pain and the results of this study support. [6,9] measure maternal satisfaction upon studies using single-dose spinal analgesis against 62 women giving birth. Maternal satisfaction, longer duration

of pain relief and side effects were observed in the group receiving the ILA is quite high. 81% said very satisfied and 11% satisfied the minimal use ILA labor pain. They concluded that a single dose spinal techniques (ILA) is very cost-effective and can be used to cope with labor pain on a regular basis.

5. Conclusion

ILA as an adequate deduction labor pain is in accordance with the conditions of Indonesia. It is based because the ILA in the process using techniques that are easier, cheaper drug, secure, fast, and effective. As is known to the ancient use of drug-reducing labor pain often cause respiratory depression in the mother and baby. The advantage to the use of ILA are as follows:

1. Using a needle that is smaller in size than the epidural needle

2. Anaesthesia drugs injected into the spinal cord CSF until moistened easily spread to spinal fluid.

3. Maternal mortality 6 times lower than general anesthesia due to reduced risk of aspiration of gastric fluid.

The challenge is getting nerve blocks:

1. What exactly according to the type of labor action to be taken without obtaining the effects or complications from anesthesia fluid administration to a higher level.

2. Use alagesia sub arhnoid block in obstetrics is often associated with the incidence of hypotension that resulted in fetal bradycardia and acidosis but is now known capital hemodinak analgesia maintain stability and provide analgesia effective capital. Expected use of ILA will be able to provide minimal labor pains were efficient, quick, easy, inexpensive, and effective.

References

[1] Kasdu D. Operasi caesar: Masalah dan solusinya. Jakarta: Puspa Swara; 2003.

[2] Sayed JA, Fathy MA. Maternal and Neonatal Effects of Adding Two Different Doses of Intrathecal Magnesium Sulphate to Bupivacain Fentanyl Spinal Anesthesia in Mild Preeclamptic Patients Undergoing Caesarean Section. Journal of American Science. 2012;8(6).

[3] Olofsson C, Ekblom A, Ekman-Ordeberg G, Hjelm A, Irestedt L. Lack of analgesic effect of systemically administered morphine or pethidine on labour pain. BJOG: An International Journal of Obstetrics & Gynaecology. 1996;103(10):968-72.

[4] Bornstein P, Sage EH. Matricellular proteins: extracellular modulators of cell function. Current opinion in cell biology. 2002;14(5):608-16.

[5] Alehagen, S, Wijma, Lunberg U, WIjma K. Fear, Pain, And Stress Hormones During Childbirth.Journal Psychosom Obstet Bynaecol. 2005 Sep;26(3):153-65

[6] Krzysztof M, Susilo Chandra. Maternal satisfaction with singledose spinal analgesia for labour pain in indonesia: a landmark study. J Anesth 2008:22(1):55-8.

[7] Carroll D, Tramèr M, McQuay H, Nye B, Moore A. Transcutaneous electrical nerve stimulation in labour pain: a systematic review. BJOG: An International Journal of Obstetrics & Gynaecology. 1997;104(2):169-75.

[8] Gonzalez JM, Xu H, Chai J, Ofori E, Elovitz MA. Preterm and Term Cervical Ripening in CD1 Mice (Mus musculus): Similar or Divergent Molecular Mechanisms? Biology of reproduction. 2009;81(6):1226-32.

[9] Leppert PC. Anatomy and physiology of cervical ripening. Clinical obstetrics and gynecology. 1995;38(2):267-79.