INTRODUCTION

Labor pain is a response of nerve stimuli caused by uterine contraction and tissue damage during delivery process. Perception and intensity of pain influence physiological condition of the patient, delivery process, and fetal condition.¹

Labor pain could induce anxiety, hyperventilation, increase blood pressure, and reduce bowel and bladder motility.²-⁶ Some events contribute into pain labor during active phase on stage I are hypoxia of uterine muscle, lactic acidosis, distension of lower segment of the uterine, stretching of...
the ligaments, and compression of the bony pelvic. The pain was induced by stimulation of afferent C nerve ending that come from uterine corpus and cervix, and this nerve fiber end at dorsal horn of spinal segment T10 up to L1 and induce visceral pain that referred to back flank. This condition will increase catecholamine that induce disregulation of uterine contraction thus induce uterine hypotonic inertia, prolonged labor, and fetal well-being.8

Sterile water intracutaneous injection on 4 points procedure at lumbosacral area is an easy and well studied to decrease visceral pain.9 This technique was simple, inexpensive, has minimal side effect, and could be given by general physician.10-12

One of the side effects of sterile water injection is inducing localized sharp pain on injection site that last for 20-30 sec. This method was not recommended by some women because the injection induced somatic pain and cause uncomfortable condition.13

We try to compare the technique with 4 points injection site and one point injection site at Michaelis Rhomboid area to check for VAS score, length of labor, and APGAR score of the baby. One point injection might give clinical improvement and comfort to the patient. In addition, one point injection technique could reduce staff number that performing the procedure and minimize the time needed to perform the procedure.14

METHOD

Subjects and Methods

This study was a single blind randomized controlled trial. The subject was 50 primigravida with aterm pregnancy on active phase of labor and planned for spontaneous delivery. Subjects were divided into 2 groups randomly, 25 women received sterile water injection at 4 points at Michaelis Rhomboid area whereas another 25 women received one point injection at the most painful area at the back flank. VAS score was evaluated at delivery room, vital sign, and other physical examination was performed to determine the dilation of the cervix and labor progress. In addition, fetal well-being was also analyzed. The midwives performed the procedure when the uterine con-

tracted. The midwives got an explanation about the procedure before and they received a closed envelope explaining the type of injection they should perform. The patient was position in the sitting position as to give good access for the midwife to do the injection. For group A (one point injection), it should first be asked where is the most painful area at the back flank. If the patient couldn’t point out the exact position because of referred pain, the injection was performed at the center Michaelis Rhomboid area. Injection was performed quickly during contraction until it formed a small blister on the skin. Group B (4 points injection), was injected at the Michaelis Rhomboid area and injection was performed by 2 midwives on the same time during uterine contraction. The patient was then evaluated for VAS score on minute 10, 30, 60, 90, and 120 by the researcher. Other examination such as vital sign, progress of labor and fetal well-being was done according to the requirement. The result was then recorded. In addition, secondary data was also recorded on 1 day post partum, such as patient satisfy to the analgesic effect of the injection, the comfort during procedure, and also patient perspective for the same procedure for the next delivery.

Data Analysis

The result of VAS score, length of labor and APGAR score of both groups was analyzed using t-test, chi square, and Mann Whitney test (significant if p<0.05).

RESULT

In this study, we obtained mean value of VAS score in the two groups, which was showed in Table 1.

Table 1. VAS Score Comparison between 2 Groups

<table>
<thead>
<tr>
<th>Time</th>
<th>One Point Group n = 25</th>
<th>Four Points Group n = 25</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAS before Inj.</td>
<td>85.40 (4.31)</td>
<td>84.60 (4.31)</td>
<td>0.509</td>
</tr>
<tr>
<td>VAS 10 minute</td>
<td>47.60 (7.23)</td>
<td>48.40 (8.50)</td>
<td>0.670</td>
</tr>
<tr>
<td>VAS 30 minute</td>
<td>40.80 (3.12)</td>
<td>40.20 (3.67)</td>
<td>0.494</td>
</tr>
<tr>
<td>VAS 60 minute</td>
<td>40.60 (3.00)</td>
<td>39.80 (4.20)</td>
<td>0.465</td>
</tr>
<tr>
<td>VAS 90 minute</td>
<td>41.20 (3.32)</td>
<td>40.60 (5.07)</td>
<td>0.568</td>
</tr>
<tr>
<td>VAS 120 minute</td>
<td>46.00 (6.45)</td>
<td>46.60 (7.73)</td>
<td>0.711</td>
</tr>
</tbody>
</table>

Note: Mann Whitney formula, Significant p<0.05
Table 1 showed that all of the variable has p value >0.05, which is insignificant. The result showed that there is no significant difference between one point injection and 4 points injection group on VAS score before until 120 min after injection.

<table>
<thead>
<tr>
<th>Table 2. The Comparison of the Length of Labor between 2 Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One Point Group</strong></td>
</tr>
<tr>
<td><strong>n = 25</strong></td>
</tr>
<tr>
<td>Lenght of Labor</td>
</tr>
</tbody>
</table>

*Note: Mann Whitney formula, Significant p<0.05*

Table 2 shows that, there's no significant difference in the length of labor between 1 site injection group and 4 site injection.

<table>
<thead>
<tr>
<th>Table 3. Comparison of APGAR Score between 2 Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One Point Group</strong></td>
</tr>
<tr>
<td><strong>n = 25</strong></td>
</tr>
<tr>
<td>APGAR 1 minute</td>
</tr>
<tr>
<td>APGAR 5 minute</td>
</tr>
</tbody>
</table>

*Note: Mann Whitney formula, Significant p<0.05*

Table 3 shows that there's no significant difference between the length of labor in 1 site injection group and 4 site injection in APGAR one minute and APGAR five minute.

Secondary data shows that in the one site injection group, 60% of the patients felt less comfortable and 40% felt comfortable. On the other hand, in the four sites injection group, 80% felt less comfortable and 20% felt uncomfortable, showing that no patients in this group felt comfortable. Mean while, the patient’s satisfaction from the decreasing pain in the one site injection group was 100%, and in the four sites injection group was 96%. We also found that in both groups, all patients wished to have the same procedure for the next labor.

**DISCUSSION**

This study showed that there was no significant difference in reduction of VAS score between group received 1-point sterile water subcutaneous injection and those who received four points injection. Both of these techniques gave adequate analgesia effect. Interruption of pain route is the final result we expected. Michaelis Rhomboid area is the location suggested for injection, because in this location the pain was felt the most intense during labor. In this perspective, it was known that hyper-stimulation of the skin can cause changes of perception visceral agent and this mechanism can change the referred pain into referred analgesia. When the sterile water is injected under the skin it may cause small bubble or papule which cause local irritation and strong stimuli on nosiceptor about 30 second. Analgesia cause by this irritation on function gate in medula spinalis level and a quite important factor to a successful therapy.12,15 Research on Iran say that gate control theory may explain analgesia effect by injection sterile water that can cause pain inhibition to medula spinalis, but because the effect only occurred on 1 segment then this study suggest that there is an involvement of non specific pain modulation.16 There is a system in human body which endogenously inhibit pain. To date, our experience regarding body system that can inhibit pain is still not well understood. A very painful stimulus will activate central pain inhibitory system's production from endogen opioids. Signals from the sensor in pain area will go through ascending pathway to the brain. Those signals will stimulate area on periaqueductal grey matter, which will produce β-endorphin and neurotensin and also stimulate great raphe nucleus to produce noradrenaline and serotonin. Those substances will go through descending pathway back to dorsal horn and will inhibit transmission on nociceptive in medulla spinalis level17-18 Other mechanism is counter-irritation mechanism. According to Melzack there is a phenomenon in which a pain stimulus can reduce other pain cause by other stimulus. Research on Iran and Sweden pictured a diffuse concept of noxious inhibitory control (DNIC) which is a physiologic mechanism that explain this counter-irritation mechanism. DNIC is a process that inhibits multiple neuron on dorsal horn of medula spinalis, in which pain stimulus is sent on part of the body but far from it's reception zone. The result will be less pain on the far side. This will support the method of injecting sterile water on laboring woman.16,15,19

Our study showed that there is no significant difference between 4-site technique and 1-site technique on length of labour and APGAR score of the
infant. To note there is a lot of factor that may affect the progress and length of labor and APGAR score of the baby. Many researches have shown that intracutaneous sterile water injection is a safe and effective alternative to reduce labor pain. Although it is not a primary option to reduce pain, but most of the patients receiving the procedure showed positive attitude and decrease in pain immediately after administration of the injection.

From this study it was found that there was 60% subjects who felt less comfortable in the group receiving 1-point technique and 80% in the group receiving 4-point technique injection. However, there were 10 subjects (40%) in the group receiving 1-point injection who expressed comfort, while no one in the other group expressed similar feeling. In addition, it was found that all patients who received 1 site injection were satisfied with the method of analgesia provided. Meanwhile in the other group, there was one person who expressed dissatisfaction regarding the pain felt during the procedure and brief analgesia effects.

Other positive responses were the desire to receive the same method in the next delivery procedure in all patients in both groups.

CONCLUSION

In conclusion, there are no significant differences in terms of reduction in VAS score, duration of labor and APGAR score of the babies born from the mothers who has received sterile water intracutaneous injection technique either in 1 site or 4 sites. But in terms of comfort, one sites techniques was better than the 4 sites technique.

REFERENCES