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Relationship between Alteration of Sacral Pain and Cervical Progression in Latent Phase of Labor : Diagnostic Study

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ABSTRACT

Objective To study the relationship between alteration of sacral pain and cervical progression in latent phase of labor.

Study design Desciptive study.

Materials and Methods Seventy-six nulliparous term pregnant women with labor pain in latent phase were recruited. Intensity of sacral pain measured by verbal analogue score (VAS) rating from 0-10, cervical dilatation and effacement were recorded at the time of study at 0 and 2 hours later.

Results Seventy-six pregnant women were recruited in the study. Among 65 women who had increased at least 1 score of VAS, 64 had cervical progression (sensitivity 92.75%, specificity 85.71%, positive predictive value 98.46%, negative predictive value 54.55%). The others, 11 women who had stable VAS, 5 women showed progression. No one had decreased VAS.

Conclusion In the latent phase of labor pain, sacral pain was effective for prediction of the cervical progression especially in the pregnant women who increased in sacral pain. Other factor such as uterine contraction must be advocated if sacral pain was stable.

Keywords: sacral pain, cervical progression, latent phase of labor

Introduction

The pain during the first stage of labor mainly originated from uterine contraction together with cervical effacement and dilatation.[1,2] The pain resulting from uterine contraction is transmitted through the T10-L1 posterior nerve root ganglia. Subsequently, the referred pain is confined to the lower abdominal wall. The pain from cervical effacement and dilatation is transmitted through the S2-S4 sacral nerves, generating the referred pain localized in the sacral region.[3]

For active management of labor, pelvic examination in labor room to determine cervical progression is recommended every 2-4 hr.[3]

However, some cases showed cervical progression faster than those routinely expected.

From the aforementioned pain pathway, it is probable that cervical progression stimulates sacral nerve and eventually accentuates sacral pain. Knowledge of the level of pain could be useful for both pain management and determining the progression of labor.

The aim of this study is to demonstrate the relationship between alteration of sacral pain and cervical progression in latent phase of labor.

Materials and Methods

This study was designed as a diagnostic test and approved by the Ethical Clearance Committee on Human Rights related to Researches Involving Human Subjects of the Faculty of Medicine Ramathibodi Hospital. Data were collected from June 2006 to January 2007.

The sample size in this research was calculated from the result of the pilot study. Fifteen pregnant women were recruited and 13 out of 15 pregnant women who had the increase in sacral pain demonstrated the increase in cervical progression. The calculated sample size in this study was 76 cases for a statistical power of 90% with a 2-tailed alpha error of 0.05.

Eighty-seven term pregnant women who met the inclusion criteria were recruited and signed consent forms. The inclusion criteria were nulliparity, 37-42 weeks of gestation, fetus in cephalic presentation, vaginal delivery designed, > 4 times of uterine contraction in 20 minutes, < 80% of cervical effacement and < 3 cm in diameter.[4] Sensation of pain was defined as the unpleasant feeling of hurt at the sacral region.[5,6] Pain was measured using verbal analogue score by the same resident at 0 and 2 hr later. The scores ranged from an integral number from 0 to 10. Zero means no pain and 10 means the worst pain imaginable as experienced.[7,8] Diameter of cervical dilatation, percentage of cervical effacement were recorded immediately after VAS assessment by the same resident at 0 and 2 hr later. The resident who assessed the VAS was a different person from the resident who assessed the cervical dilatation and effacement. Increased sacral pain was defined as increased one or more VAS score at 2 hour apart. Cervical progression was defined as the increased in cervical effacement at least 20% and/or increased in cervical dilatation in discrete number at least 1 cm.

The recorded data consisted of all important information including; age, gestational age, pain score, cervical effacement, cervical dilatation and uterine contraction.

Results

In this study, 11 pregnant women were excluded due to augmentation (3 cases), using sedative drugs (5 cases), using regional analgesia (2 cases) and fetal distress (1 case).

The data of the remaining seventy-six pregnant women were analyzed. The median age was 27 years (range 21-32 years) and gestational age was 38 weeks (range 37-40 weeks). The median of cervical dilatation at 0 and 2 hr apart were 2 (range 1-3 cm) and 3 cm (range, 1-4 cm), cervical effacement were 50 percent (range 50-80 percent) and 80 percent (range 50-100 percent), pain scores were 3 (range 2-5 scores) and 5 (range 3-6 scores), uterine contraction in 20 minutes were 4 (range 4-6 times) and 5 (range 4-7 times), respectively (Table 1).

In Table 2, sixty-four out of sixty-five women who had increased in sacral pain had cervical progression (sensitivity 92.75%, specificity 85.71%, PPV 98.46%, NPV 54.55%). Eleven women with stable VAS, 5 women showed progression and 6 women showed no progression of cervix. None had decreased VAS.

Table 1. The characteristics of pregnant women

Characteristics		N=76 median (range)
Age (Yr)		27 (21-32)
Gestational age (wk)		38 (37-40)
Cervical dilatation (cm)	0 hr	2 (1-3)
	2 hr	3 (1-4)
Cervical effacement (%)	0 hr	50 (50-80)
	2 hr	80 (50-100)
Pain score	0 hr	3 (2-5)
	2 hr	5 (3-6)
Uterine contraction (times/20 min)	0 hr	4 (4-6)
	2 hr	5 (4-7)

Table 2. The increased in sacral pain and cervical progression

	Cervical progression No (%)		
Sacral pain	**Progression**	**No progression**	**Total**
Increase	64 (84.21)	1 (1.32)	65 (85.53)
Stable	5 (6.58)	6 (7.89)	11 (14.47)
Total	69 (90.79)	7 (9.21)	76 (100)

Table 3. The increased in sacral pain and cervical progression

Parameter		(95% CI*)
Sensitivity	92.75%	(86.92% - 98.58%)
Specificity	85.71%	(77.85% - 93.58%)
Positive predictive value	98.46%	(95.69% - 101.23%)
Negative predictive value	54.55%	(43.35% - 65.74%)

* 95% CI = 95% Confidence Interval

Discussion

The results from this study showed that the increase in sacral pain tended to have an increase in cervical progression with sensitivity 92.75%, specificity 85.71%, PPV 98.46% and NPV 54.55%, respectively. Progressive pain seems to indicate true cervical progression whereas stable pain difficult to predict no progress of cervix.

This is the first research on the sacral pain and the cervical progression. These studies had high reliability because assessment of VAS was performed by the same resident at 0 and 2 hr apart to reduced the inter-observer variation, while the assessment of cervical effacement and dilatation were performed by the other resident to reduce measurement bias. During the assessment of pain,

no medical or surgical intervention was performed to make the assessment much more reliable.

The limitation of this study is the measurements of cervical effacement and dilatation are subjective and there is no direct accurate equipment to measure. Also the pain score which depends on many factors because pain is very subjective and individually based, however to improve the accuracy, we used only one resident to perform the examination in each case in order to minimize the confounding factors.

The results from this study may be used to adjust the interval between each vaginal examination to evaluate the cervical progression which should be varied according to the intensity of the sacral pain. Mandatory vaginal examination is required if sacral pain intensify. Other factor such as the uterine contraction intensify may be the additional predictive factor in case of the stable sacral pain.

Conclusion

In the latent phase of labor pain, sacral pain was effective for prediction of the cervical progression especially in the pregnant women who increased in sacral pain. Other factor such as uterine contraction must be advocated if sacral pain was stable. This knowledge may help the health personnels to adjust the interval of pelvic examinations and provide proper pain management. Further study of sacral pain is needed to extend the usefulness for prediction of labor progression.

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References

1. Bonica JJ. Labour pain. In: Wall PD, Melzack R, editors. Textbook of pain. Edinburgh: Churchill Livingstone, 1984;377-92.
2. Brown ST, Campbell D, Kurtz A. Characteristics of labor pain at two stages of cervical dilation. Pain 1989;38:289-95.
3. Cunningham FG, Leveno KJ, Bloom SL, Hauth JC, Gilstrap LC 3rd, Wenstrom KD. Williams Obstetrics, 22nded. New York: McGraw-Hill, 2005;26-7,438-9, 477-80.
4. Rouse DJ, Owen J, Hauth JC. Criteria for failed labor induction: Prospective evaluation of a standardized protocol. Am J Obstet Gynecol 2000;96:671-7.
5. Kenshalo DR, Douglass DK. The role of the cerebral cortex in the experience of pain. In: Bromm B, Desmedt JE, editors. Pain and the brain from nociception to cognition. New York: Raven Press, 1995;21-34.
6. Merskey H, Bonica JJ, Carmon A, Dubner R, Kerr FWL, Lindblom U, et al. Pain terms: a list with definitions and notes on usage. Pain 1979;6:249-52.
7. Sah N, Vallejo MC, Ramanathan S, Golebiewski K. Bupivacaine versus L- bupivacaine for labor analgesia via combined spinal-epidural: a randomized, double-blinded study. J Clin Anesth 2005;17:91-5.
8. Webster LR, Walker MJ. Safety and efficacy of prolonged outpatient Ketamine infusions for neuropathic pain: retrospective. Am J Ther 2006;13: 300-5.

ความสัมพันธ์ระหว่างการเปลี่ยนแปลงความเจ็บปวดที่หลังบริเวณกระเบนเหน็บกับการขยายตัวของปากมดลูกในระยะเจ็บครรภ์คลอด Latent phase

วัชริญา พรประเสริฐสุข, ฉัตรชัย ตรีธรรมพินิจ, ณัฐพงศ์ อิศรางกูร ณ อยุธยา, ประทักษ์ โอประเสริฐสวัสดิ์, ศศิวิมล รัตนสิริ

วัตถุประสงค์ *: เพื่อศึกษาความสัมพันธ์ระหว่างการเปลี่ยนแปลงความรุนแรงของการปวดร้าวไปหลังบริเวณกระเบนเหน็บกับการขยายตัวของปากมดลูกในขณะเจ็บครรภ์คลอดระยะ Latent phase*

วัสดุและวิธีการ *: ศึกษาแบบ diagnostic study ในหญิงตั้งครรภ์ครบกำหนดที่เข้าสู่สภาวการณ์เจ็บครรภ์คลอดและมาคลอดที่ห้องคลอดของโรงพยาบาลรามาธิบดี ระหว่างเดือนมิถุนายน พ.ศ.2549 – มกราคม พ.ศ.2550 หญิงตั้งครรภ์ 76 ราย จะได้รับการประเมินความเจ็บปวดที่หลังบริเวณกระเบนเหน็บโดยใช้ Verbal analogue score (VAS) เป็นเลขจำนวนเต็มตั้งแต่ 0-10 คะแนน ก่อนทำการตรวจภายในเพื่อประเมินการขยายตัวของปากมดลูก ที่ 0 และ 2 ชั่วโมง ภายหลังรับไว้ในโรงพยาบาล*

ผลการศึกษา *: หญิงตั้งครรภ์ทั้งหมด 76 ราย พบว่า 65 รายมีความเจ็บปวดบริเวณกระเบนเหน็บเพิ่มมากขึ้น และจำนวนนี้พบว่า 64 ราย มีการขยายตัวของปากมดลูกเพิ่มขึ้น ค่าความไวและความจำเพาะของการศึกษานี้เท่ากับ 92.75%และ 85.71% ตามลำดับ ส่วน positive predictive value และ negative predictive value เท่ากับ 98.46% และ 54.55% ตามลำดับ*

สรุป *: ในระยะ Latent phase ของการเจ็บครรภ์คลอด ความปวดร้าวไปหลังบริเวณกระเบนเหน็บที่เพิ่มขึ้นสามารถทำนายการขยายตัวของปากมดลูกได้ผลดีในกลุ่มหญิงตั้งครรภ์ที่มีความปวดร้าวไปหลังบริเวณกระเบนเหน็บที่เพิ่มมากขึ้น แต่ไม่สามารถทำนายได้ในกลุ่มของหญิงตั้งครรภ์ที่ความปวดร้าวไปหลังบริเวณกระเบนเหน็บไม่เปลี่ยนแปลง ซึ่งอาจจำเป็นต้องใช้ปัจจัยอื่นที่มีผลต่อการเปลี่ยนแปลงการขยายตัวของปากมดลูกร่วมประเมินด้วย*