Clinical Correlates of Pain with Second-Trimester Genetic Amniocentesis

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Objective: *To determine the correlation of clinical factors and maternal perceptions of pain with genetic amniocentesis.*
Material and Method: *This prospective study of midtrimester, singleton pregnancies was conducted between February 2007 and March 2008. Study variables included patient dermographics, previous amniocentesis, previous abdominal surgery, maternal anxiety score, abdominal wall thickness, needle insertion through placenta and the depth of needle insertion. Maternal pain with performing amniocentesis was subjectively quantified with the Thai short-form McGill Pain Questionnaire. The independent T-test, one way ANOVA and linear regression were used for analysis, a probability value of < 0.05 was considered significant.*
Results: *One hundred and twenty-five pregnant women participated in the present study: 18.4% reported no pain, 69.6% described the pain as mild, 11.2% described the pain as discomforting and 0.8% described the pain as horrible. Mean intensity of pain was 2.1 ± 1.9 (on a scale 0-10). Pain was most often described as fearful, shooting, throbbing and sharp. Parity, gestational age, maternal BMI, anxiety score, previous surgery, needle insertion through the placenta, abdominal wall thickness and the depth of needle insertion were not correlated with perceived pain.*
Conclusion: *Most of the women reported no pain or mild or discomfort with genetic amniocentesis. Clinical factors were not associated with maternal perceptions of pain.*

Keywords: *Amniocentesis, Pain, Clinical factors, Second trimester*

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Amniocentesis is the most common invasive procedure that is used for prenatal diagnosis of genetic disorders and usually performed between 14-20 weeks[1]. This procedure is performed without local anesthetic for a variety of indications that include advanced maternal age, abnormal maternal serum screening and abnormal ultrasound findings. Complications of amniocentesis are infrequent and include transient vaginal spotting or amniotic fluid leakage in 1 to 2% of patients, chorioamnionitis in less than 0.1% and fetal loss rate in less than 0.5%[1]. Although serious complications are uncommon, the typical amniocentesis candidate is afraid that the procedure will cause fetal malformations and anxious about the pain she believes to be associated with it[2].

The pregnant women usually ask their health care professionals to describe the characteristics and intensity of the pain they will experience. However, there are little reported data on the sensory or affective dimensions of pain that is associated with mid-trimester genetic amniocentesis or clinical characteristics that are associated with increased pain[3-8]. The degree of pain and the various clinical factors that modurate it have not been adequately established, especially the data of Asian or Thai pregnant women.

The objectives of the present study were to determine whether sensory or affective dimensions of pain associated with second trimester amniocentesis, as measured the pain by a validated pain scale, are associated with any identifiable clinical correlates.

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Material and Method

All pregnant women with singleton pregnancy, who participated in the present study, had been referred for genetic counseling in the second trimester of pregnancy and had consented to have amniocentesis performed at the prenatal clinic of the outpatient department, Nakornping Hospital, Chiang Mai, Thailand between February 2007 and March 2008. The present study was approved by the Ethical Review Committee for Research in Human Subjects Ministry of Public Health. Exclusion criteria were multiple pregnancy, previous premature rupture of membrane, placenta previa with vaginal bleeding and the participants can't read or understand a questionnaire. Written informed consent was obtained from all participants after the researcher explained to the enrolled in the study. Participants were asked to complete a questionnaire before amniocentesis that assessed maternal age, education level, number of parity, previous amniocentesis, previous abdominal surgery and maternal anxiety score by the Thai version of Hospital Anxiety and Depression Scale (Thai HADS)[9].

All amniocentesis were performed by only staff of the prenatal clinic with continuous ultrasound guidance with the use of a 22-guage spinal needle. No local anesthetic was used during the procedure. Approximately 16-18 millilitres of amniotic fluid was obtained. Fetal cardiac activity was observed before the procedures and the patients routinely rested for about 30 minutes after the procedure then it was checked.

Immediately after the procedure, participants were asked to complete the Thai short-form McGill Pain Questionnaire to subjectively quantify the patient's perceived pain. The Thai short-form McGill Pain Questionnaire (Th-SFMPQ) is a previously good internal consistency and validated tool that asks respondents to describe the intensity of pain that they experienced pain level and to describe the sensation experienced with the use of 15 descriptors on a scale of 0 (none) to 3 (severe)[10]. Th-SFMPQ also includes a visual analog score(VAS) and the patients were asked to indicate a point along a 10 centimetres (cm) horizontal continuous line from 0 to 10 cm. This was scored from 0 (no pain) to 10 (worst possible pain) to the nearest 0.1 cm with the use of the standard ruler. In addition, the performing physician provided data regarding fetal ultrasono-graphic measurements were carried out in order to verify the gestational age, abdominal wall thickness, the location of the placenta, needle insertion through placenta and the depth of needle insertion.

The sample size calculation was based on the data from the study of Harris A et al[5]. Statistical analysis used was performed using SPSS for Windows version 11.5 software. Descriptive statistics were presented as mean $\pm$ standard deviation (SD). The dependent sample t-test, one way of analysis of varience and linear regression analysis were used to identify associations between clinical variable and VAS pain score; a probability value of < 0.05 was considered significant.

Results

One hundred and sixty six pregnant women had amniocentesis during the present study period. One hundred and twenty five pregnant women (75.3%) were enrolled in the present study, The dermographic characteristics are shown in Table 1. The mean age of the participants was 36.9 ± 2.8 years with a range of 21 to 43 years. Most of the patients had one child (64%). The mean gestational age was 17.0 ± 1.3 weeks with a range of 15-21 weeks. The mean BMI was 24.3 ± 3.4 kg/m^2. Before the procedure, mean anxiety score of Thai HADS (minimum 0 and maximum 21) was 6.6 ± 3.2 with a range of 1 to 16.

The descriptive statistics of the Thai short-form McGill Pain Questionnaire are shown in Table 2. The mean intensity of pain with the use of VAS was 2.1 ± 1.9. Eighteen percent of the patients reported no pain during the procedure, 69.6% described the pain as mild, 11.2% the pain as discomforting and only one described the pain as horrible. Of the affective and sensory descriptors that were listed on the Th-SFMPQ, the pain was described most often as shooting (73%), fearful (64%), throbbing (63%) and sharp (57%).

The most indications for amniocentesis were advanced maternal age (96.8%). All amniocentesis were performed with a single needle insertion. All samples of amniotic fluid collected had a clear colour and no complications were reported.

Clinical correlates of the patients are shown in Table 3. A parity was not associated with VAS of pain (nullipara: one child: $\geq$ 2 children = 2.6 ± 2.1: 2.0 ± 1.8: 1.9 ± 2.4; $p = 0.388$, 95% CI = -0.9 to 0.7). The patient with previous amniocentesis can not analyses statistical used because this group had only one. There was no significant difference between the patients with and without previous abdominal surgery (2.2 ± 2.0 vs. 2.1 ± 1.9; $p = 0.882$) and needle insertion through the placenta also revealed no impact on the

Table 1. Characteristics of 125 women undergoing mid-trimester amniocentesis

Characteristics	No. (%)
Age, years (mean ± SD = 36.9 ± 2.8; range = 21-43)	
< 35	4 (3.2)
≤ 35	121 (96.8)
Parity (mean ± SD = 2.0 ± 0.6; range = 0-4)	
Nullipara	23 (18.4)
One child	80 (64.0)
≥ 2 children	22 (17.6)
Education level	
Elementary	52 (41.6)
High school or college	39 (31.2)
Postgraduate or higher	34 (27.2)
Body mass index, kg/m^2 (mean ± SD = 24.3 ± 3.4; range =18.73-38.21)	
< 25 (normal)	81 (64.8)
≥ 25 (overweight)	44 (35.2)
Gestational age, weeks (mean ± SD = 17.0 ± 1.3; range = 15-21)	
15-16	51 (40.8)
17-18	58 (46.4)
≥ 19	16 (12.8)
Previous amniocentesis	
No	124 (99.2)
Yes	1 (0.8)
Previous abdominal surgery	
No	90 (72.0)
Yes	35 (28.0)
Anxiety score (mean ± SD = 6.6 ± 3.2; range = 1-16)	
Abdominal wall thickness, centimetres (mean ± SD = 2.0 ± 0.6; range = 0.9-5.7)	
Depth of needle insertion, centimetres (mean ± SD = 6.1 ± 1.2; range = 2.6-9.0)	
Needle insertion through placenta	
No	79 (63.2)
Yes	46 (36.8)

Table 2. Descriptive statistics of the Thai short-form McGill Pain Questionnaire

Scale	Mean ± SD	Minimum-maximum
Sensory pain score (0-33)	5.5 ± 4.8	0-21
Affective pain score (0-12)	1.8 ± 1.9	0-8
Total pain score (0-45)	7.3 ± 6.1	0-29
VAS (0.1-10.0)	2.1 ± 1.9	0.1-8.8
Present pain intensity (0-5)	0.95 ± 0.6	0-4

SD = standard deviation, VAS = visual analog scale

intensity (2.2 ± 1.9 vs. 1.9 ± 2.0; p = 0.378, 95% CI = -0.4 to1.0). Linear regression analysis indicated that gestational age (p = 0.502), body mass index (p = 0.327), anxiety score (p = 0.331), abdominal wall thickness (p = 0.264) and the depth of needle insertion (p = 0.859) were not correlated with the intensity of perceived pain.

Discussion

Pain is a complex, multi-dimensional sensation that varies in perception from one individual to another. Pain assessment is not simple, it requires enough assessed time and the appropriate tools. The present study used Thai short-form McGill Pain Questionnaire

Table 3. Clinical correlates of the patients

Clinical factors	VAS (mean ± SD)	p-value	95% CI
Parity			
Nullipara	2.6 ± 2.1	0.388[a]	-0.9, 0.7
One child	2.0 ± 1.8		
≥ 2 children	1.9 ± 2.4		
Previous abdominal surgery			
No	2.1 ± 1.9	0.822[b]	
Yes	2.2 ± 2.0		
Needle insertion through placenta			
No	2.2 ± 1.9	0.378[b]	-0.4, 1.0
Yes	1.9 ± 2.0		
Gestational age	-	0.502[c]	-
Body mass index	-	0.327[c]	-
Anxiety score	-	0.331[c]	-
Abdominal wall thickness	-	0.264[c]	-
Depth of needle insertion	-	0.859[c]	-

SD = standard deviation, VAS = visual analog scale, CI = confidence interval
[a] One-way ANOVA
[b] Independent sample t-test
[c] Linear regression analysis

(Th-SFMPQ) to measure maternal pain and it was translated from the original English version of SFMPQ. The Th-SFMPQ consists of three parts, the first part has eleven sensory and four affective pain descriptors, the second part has Visual Analog Scale (VAS) and the third part has Present Pain Intensity (PPI)[10]. A review of the literature, revealed only 1 previous study that used SFMPQ)[5] while several studies used only VAS to assess perceived pain.

Maternal anxiety was not correlated with increased perceived pain in the present study, while there was only 1 previous study that examined the correlation between maternal anxiety with increased pain and used a VAS on 7-cm line to assess anxiety level[5]. The authors used the Thai version of Hospital Anxiety and Depression Scale (Thai HADS), a reliable and valid instrument for the screening of anxiety and depression in Thai patients[9], different from the other studies.

The maternal pain was not correlated with parity in the present study, this is in contrast to the report of Karasahin et al[8] who noted that pain scores were higher in nulliparous than parous women. Furthermore, a gestational age and body mass index (BMI) was not correlated with pain scores the same as the report of Harris et al[5] and Karasahin et al[8].

Harris et al[5] reported that a history of previous amniocentesis was correlated with significantly increased pain. In contrast, Ferber et al[3] noted that previous amniocentesis was correlated with reduced pain while Lekskul et al[6] showed no statistically significant difference between these two groups. The present study could not analyze because there was only 1 woman with previous amniocentesis. The conclusions that can be drawn from previously mentioned studies, with respect to the effect of previous amniocentesis, are limited because of the small proportion of subjects (0.8% in the present study, 12% in the report of Harris et al, 19% in the report of Ferber et al and 9.7% in the report of Lekskul et al). In a history of previous abdominal surgery, it was not correlated with perceived pain the same as the report of Harris et al[5] and Lekskul et al[6].

The conditions of procedure were needle insertion through the placenta, abdominal wall thickness and the depth of needle insertion, these were not correlated with maternal pain. While Lekskul et al[6] reported that needle insertion through the placenta was not correlated, Karasahin et al[8] reported that abdominal wall thickness was not correlated and Harris et al[5] reported that and the depth of needle insertion was not correlated with pain. These results of our and mentioned studies demonstrated the perceived pain that varies in quality, strength, duration, location and unpleasantness from individual patients.

In conclusion, according to the results of the present study, nearly all patients reported no pain or mild pain or discomfort with amniocentesis and mean intensity of pain was 2.1 $\pm$ 1.9 while the previous reports demonstrated a pain level of Lekskul (2.7 $\pm$ 2.2), Harris (1.6 $\pm$ 1.3; on a scale of 0-7 cm) and Ferber (2.1 $\pm$ 2.0). In the mentioned studies, maternal pain was quite low by VAS measurements, these results may not be necessary to discover the technique or methods to decrease maternal pain during amniocentesis. The authors should routinely counsel a patient about the severity, type of pain and the actual pain experienced during the procedure as significantly lower than that expected, this will decrease the anxiety and the maternal pain experienced in mid-trimester genetic amniocentesis.

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ความสัมพันธ์ของปัจจัยทางคลินิกกับความเจ็บปวดจากการเจาะน้ำคร่ำในสตรีตั้งครรภ์

วัชรินทร์ สุนทรลิ้มศิริ, กาญจนา นวลแก้ว

วัตถุประสงค์: *เพื่อศึกษาความสัมพันธ์ของปัจจัยต่าง ๆ ทางคลินิกกับความเจ็บปวดที่เกิดจาก การเจาะน้ำคร่ำตรวจทางพันธุกรรม ของ ทารก ในครรภ์มารดา*

วัสดุและวิธีการ: *การศึกษาแบบไปข้างหน้าในสตรีตั้งครรภ์ที่มารับการเจาะน้ำคร่ำที่คลินิกตรวจวินิจฉัยก่อนคลอด โรงพยาบาลนครพิงค์ตั้งแต่เดือนกุมภาพันธ์ 2550 ถึงมีนาคม 2551 ผู้ศึกษาได้ประเมินความเจ็บปวดจากการเจาะน้ำคร่ำโดยใช้ Thai short-form McGill Pain Questionnaire (Th-SFMPQ) โดยเก็บข้อมูลของผู้รับบริการและปัจจัยต่าง ๆ ที่ต้องการศึกษา และนำมาวิเคราะห์โดยใช้สถิติที่เหมาะสมกับข้อมูล*

ผลการศึกษา: *ข้อมูลจากสตรีตั้งครรภ์ที่มารับการเจาะน้ำคร่ำจำนวน 125 ราย ได้นำมาวิเคราะห์พบว่า มารดาส่วนใหญ่ประมาณร้อยละ70 มีความเจ็บปวดเล็กน้อย, ร้อยละ18.4 ไม่ปวดเลย, ร้อยละ11.2 ปวดพอรำคาญ และมี 1 รายที่ปวดมากจนทุกข์ทรมาน ความเจ็บปวดโดยเฉลี่ยเท่ากับ 2.1 $\pm$ 1.9 และลักษณะความเจ็บปวด ส่วนใหญ่คือ รู้สึกหวาดกลัวความเจ็บปวด ปวดจี๊ด ปวดตุ๊บ ๆ และปวดแปลบ ปัจจัยต่าง ๆ ที่ศึกษาได้แก่ จำนวนการคลอดบุตร อายุครรภ์ ดัชนีมวลกาย คะแนนความวิตกกังวล ประวัติการผ่าตัดบริเวณหน้าท้อง การแทงเข็มผ่านรก ความหนาของผนังหน้าท้องและความลึกของเข็มที่เจาะ ปัจจัยเหล่านี้ไม่มีความสัมพันธ์กับความเจ็บปวดของมารดา*

สรุป: *มารดาส่วนใหญ่ที่ได้รับการเจาะน้ำคร่ำเพื่อตรวจทางพันธุกรรมของทารกในครรภ์มีความเจ็บปวดเพียงเล็กน้อย และไม่มีปัจจัยทางคลินิกใดที่มีความสัมพันธ์กับความเจ็บปวดของมารดา*