Outcome of Second Trimester Amniocentesis in Singleton Pregnancy at Songklanagarind Hospital

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Objective: *To evaluate the outcome of genetic amniocentesis in singleton gestation at Songklanagarind Hospital*
Material and Method: *This was a descriptive study that included all singleton pregnant women who had a second trimester amniocentesis for chromosome studies at the Maternal Fetal Medicine Unit, Department of Obstetrics and Gynecology, Songklanagarind Hospital between January 1998 and 2006 to assess the outcome including risk of fetal loss in such cases.*
Results: *Advanced maternal age was the most common indication for amniocentesis. Amniocentesis after positive screening aneuploidy test increased. The fetal loss within 14 days after the procedure was 0.12% (10/8,073). Leakage of amniotic fluid occurred 0.1% (5/8,073) but only one case aborted. Fever occurred in two cases and a case of chorioamnionitis was diagnosed.*
Conclusion: *The rate of fetal loss within 14 days after amniocentesis in singleton pregnant women was lower than the authors' previous 10 years. The anxiety of the family and difficulty of counseling to the family will be reduced because of a lower complication rate. Moreover, the pregnant women who have a high degree of anxiety for genetic abnormalities are a likely choice for genetic amniocentesis if the risk rate regarding the patient's age, ultrasonographic finding, or maternal serum screening is around 0.1%.*

Keywords: *Genetic amniocentesis, Singleton pregnancy*

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Amniocentesis is the most common invasive prenatal diagnostic procedure that is performed at Songklanagarind Hospital. Usually it is used to diagnose fetal status such as fetal chromosomes, intrauterine infection, and fetal genetic analysis. The number of women who undergo amniocentesis is significantly increasing. In the first 10 years of the authors' service, the number of women who underwent genetic amniocentesis was reported around 1,016 cases. Now more than 1,000 cases of pregnant women undergo amniocentesis in one year. In a previous study, the abortion rate was reported 0.3% during the first 10 year period[1]. The authors conducted the present study to assess the risk of fetal loss after a second trimester genetic amniocentesis at the Maternal Fetal Medicine Unit, Department of Obstetrics and Gynecology, Songklanagarind Hospital during the next 10 years after the authors' previous review. The authors realized that the fetal loss during this period should be lower than the past and the information was necessary to provide future pre-procedure counseling.

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Material and Method

The present study included all pregnancies that underwent genetic amniocentesis for chromosome study at the Maternal Fetal Medicine Unit, Department of Obstetrics and Gynecology, Songklanagarind Hospital between January 1998 and December 2006. This group included the presented patients and referred cases from hospitals in other provinces in southern Thailand, as Songklanagarind Hospital is the only tertiary referral center in southern Thailand. At the time of procedure, each patient had an ultrasound scan to confirm the gestational age before the amniocentesis, using real-time ultrasound (Toshiba Sonolayer SSA 250A, 3.75 MHz curvilinear probe and Voluson 730 GE Medical Systems, Kretztechnik, Zipf, Austria device, 2-5 MHz curvilinear probe). The

number of fetus, gestational age, and placental localization were collected. Genetic counseling was provided for all pregnant women before undertaking the procedure. Amniocentesis was performed under continuous ultrasound monitoring with a 22-gauge spinal needle. The first 1-2 ml of amniotic fluid was discarded in order to avoid maternal cell contamination and then 15-20 ml of amniotic fluid was aspirated in a separate syringe and sent for cell culture. Fetal karyotyping was performed using the Giemsa-Trypsin-G-banding technique at the Human Genetics Unit, Department of Pathology, Songklanagarind Hospital. Detected complications were immediately recorded in the hospital database.

All women were followed within 14 days after the procedures when the results had been obtained. The authors collected patient demographic data, operative records, late complications, and pregnancy outcomes from medical records of patients who delivered at Songklanagarind Hospital. Multiple pregnancies were excluded from the present study. For missing data, the authors interviewed the patients by telephone or mail. Institutional Review Board approval was obtained for the present study.

Results

Eight thousand seventy three pregnancies underwent genetic amniocentesis during the study period. The number of procedures increased dramatically year by year from 258 in 1,998 to 1,288 in 2006. (Fig. 1) Approximately 77% of patient's maternal age was between 35-39 years of age (Table 1). Most procedures were performed between 16-18 weeks (86%) (Table 2).

Advanced maternal age was the most common indication for amniocentesis (96%). Other indications for amniocentesis were previous child trisomy, previous child structural abnormality, patient anxiety, family history of trisomy, and a positive anueploid screening test (Table 3). Regarding previous child trisomy, all cases reported normal chromosomes in their current pregnancy. Only one in 32 cases of positive anueploid screening test, the result of chromosome were abnormal.

The success rate of the cell culture was 99.9% (8,066/8,073). Only seven cases (1.8%) had cell culture failure. The prevalence of fetal chromosomal abnormalities based on the first attempt of amniocentesis with a successful cell culture was 1.0% (143/8,066). Among 143 cases of abnormal chromosomes, trisomy 21 was the most common. Genetic counseling was provided after the results had been obtained in those cases with fetal chromosome abnormalities.

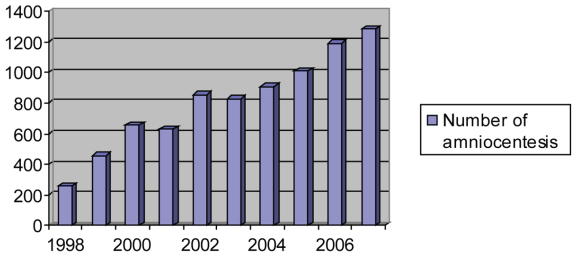

Fig. 1 Number of amniocentesis per year

Table 1. Maternal age group

Age group (years)	Number	Percent
20-24	41	0.5
25-29	103	1.3
30-34	151	1.9
35-39	6,227	77.1
40-44	1,298	16.1
> 44	253	3.1
Total	8,073	100.0

Table 2. Gestational age at time of amniocentesis

Gestational age (weeks)	Number	Percent
< 16	25	0.3
16-18	6,940	86.0
19-21	1,108	13.7
Total	8,073	100.0

Table 3. Indications for amniocentesis

Indications	Number	Percent
Advanced maternal age	7,749	96.0
Previous trisomy child	117	1.4
Family history of trisomy	76	0.9
Abnormal sonographic finding	41	0.5
Thalassemia with chromosomal study request	12	0.1
Previous anomaly child	41	0.5
Positive screening test	32	0.4
Other	5	0.1
Total	8,073	100.0

Table 4. Complications within 14 days after procedure

Complication	Number	Detail	Outcome
Pelvic pain	1	Day 13th after the procedure	Abortion
	1	Day 2nd after procedure	Abortion
	1	Day 14th after procedure	Abortion
Fetal death	1	Day 2nd after procedure, green color amniotic fluid	Abortion
	2	Day 3rd after procedure	Abortion
	2	Day 14th after procedure	Abortion
Fever	1	Unknown caused	Spontaneous resolved and continue pregnancy to term
	1	Chorioamnionitis 1 day after procedure	Abortion
Leakage of amniotic fluid	1	12 hours after procedure	Continue to term
	2	Day 1st after procedure	Continue to term
	1	Day 5th after procedure	Abortion
	1	Day 7th after procedure	Continue to term
Vaginal spotting	1	1 hour after procedure	Continue to term
	1	Day 14th after procedure	Continue to term
	1	Underlying squamous cell carcinoma of cervix	Continue to term

Among various indications for amniocentesis, abnormal sonographic findings showed the highest percentage of fetal chromosomal abnormalities (22%) (Table 5).

In all cases, any detected complications were reported within 14 days after the procedure. Most of the pregnant women complained of mild pelvic pain. Patients with severe pelvic pain who needed admission was reported in only three cases (0.04%) and the symptoms were relieved by a non-steroidal inflammatory drug. None of cases needed morphine or morphine derivatives. Amniotic fluid leakage was found in five cases (0.06%) but only one case had a spontaneous abortion. Most amniotic fluid leakage after the second trimester genetic amniocentesis spontaneously healed and patients continued their pregnancy until term and delivered normal babies. There was no record of any difficulty during the amniocentesis. Maternal fever was reported in two cases and one was diagnosed with chorioamnionitis, therefore a termination of pregnancy was performed. Regarding the other case, the patient's fever spontaneously resolved and her pregnancy continued to term and she delivered without complication. Vaginal bleeding was reported in three cases but none of the cases had a spontaneous abortion (Table 4).

The pregnancy outcomes of those with normal chromosome were followed in only 4002 cases. The fetal loss rate after the fourteen day of the procedure was 1.6% including spontaneous (1%), and death of the fetus in utero (0.6%). Premature and term delivery were 9.0% and 89.2% respectively (Table 6).

Table 5. Results of the chromosome studies of 8066 cases

Results	Number	Percent
Normal chromosome	7,923	98.0
Abnormal chromosomes	143	1.8
Autosomal trisomy	100	1.2
Trisomy 21	72	
Trisomy 18	17	
Trisomy 13	9	
Trisomy 22	2	
Translocations	16	0.2
Mosaicism	6	0.1
45, X	7	0.1
Other abnormal chromosomes	14	0.2

Table 6. Pregnancy outcome of 4002 cases

Outcomes	Number	Percent
Fetal loss		
Spontaneous abortion	48	1.2
Dead fetus in utero	24	0.6
Live birth		
Preterm delivery	360	9.0
Term delivery	3,570	89.2

Discussion

Over the 10-year period, the number of genetic amniocentesis performed in Songklanagarind Hospital has increased. The most common indication was advanced maternal age, which is similar to that of other studies and similar[2,3] to the authors' previous study in the past 10-year before[1]. The number of pregnant women who underwent genetic amniocentesis due to a positive aneuploid screening test increased year by year. This result showed that the knowledge and awareness of pregnant women for aneuploid screening test had improved, especially for low risk pregnant women for example the pregnant women who were younger than 35 years old with no previous history and family history risk of fetal chromosomal abnormalities, but the cost effectiveness in Songklanagarind Hospital should be studied. Pregnant women who had undergone genetic amniocentesis because of a previous child affected by abnormal chromosome did not have a repeat chromosome abnormality. Although this finding can be explained by the statistic probability, the results help the authors to reduce the anxiety of the patient in the pre-procedure counseling.

The prevalence of chromosome abnormality from second trimester amniocentesis in the present study was 1%, which was less than our previous reports[1]. It could be explained by the change of the authors' prenatal diagnostic procedural decision from amniocentesis to fetal blood sampling when an abnormal ultrasonographic findings presented, the authors firstly tried to perform fetal blood sampling in all cases. So the results of chromosome abnormality were reported by fetal blood sampling procedure. Overall, fetal abnormal chromosomal number may not change.

The fetal loss within 14 days after the procedure was 0.12%. Compared with other studies, the rate of fetal loss was lower than the authors past study and other studies performed in the past 10 year[1,4,5].

Fortunately, the recent study performed by Odibo, et al in 2008, showed the fetal loss rate was about 0.13%[6]. The fetal loss rate was comparable with the present study. However, the incidence of minor complications such as acute pelvic pain, vaginal spotting, leakage of amniotic fluid and chorioamnionitis were very low. Therefore, the counseling about the safety of genetic amniocentesis using the newer rate of complications will relieve the anxiety of pregnant women. Moreover, for the decision of performing the diagnostic procedure in the pregnant women who carry a lower risk may be easier.

In conclusion, the complications of genetic amniocentesis in the second trimester of pregnancy have decreased. However, counseling before the procedure is still very important.

Potential conflicts of interest

None.

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ผลของการเจาะน้ำคร่ำหญิงตั้งครรภ์เดี่ยวในไตรมาสที่สองที่โรงพยาบาลสงขลานครินทร์

ธารางรัตน์ หาญประเสริฐพงษ์, อุ่นใจ กออนันตกุล, วิศิษฐ์ ประสาธน์วนกิจ, เรืองศักดิ์ ลีธนาภรณ์, ฐิติมา สุนทรสัจ, จิตเกษม สุวรรณรัฐ

วัตถุประสงค์: *เพื่อศึกษาผลของการเจาะน้ำคร่ำหญิงตั้งครรภ์เดี่ยวในไตรมาสที่สองที่โรงพยาบาลสงขลานครินทร์*
วัสดุและวิธีการ: *เป็นการศึกษาเชิงพรรณนา โดยการเก็บข้อมูลหญิงตั้งครรภ์เดี่ยวทุกรายที่เข้ารับการเจาะน้ำคร่ำเพื่อตรวจจำนวนแท่งพันธุกรรมในไตรมาสที่สองของการตั้งครรภ์ ที่หน่วยเวชศาสตร์มารดาและทารกในครรภ์ ภาควิชาสูติศาสตร์ และนรีเวชวิทยา โรงพยาบาลสงขลานครินทร์ ระหว่างเดือนมกราคม พ.ศ. 2541 ถึง เดือน ธันวาคม พ.ศ. 2549 เพื่อประเมินผลของการเจาะน้ำคร่ำซึ่งรวมถึงการสูญเสียทารก*
ผลการศึกษา: *หญิงตั้งครรภ์เดี่ยวที่เข้ารับการเจาะน้ำคร่ำส่วนใหญ่มีข้อบ่งชี้คือ อายุมารดามาก จำนวนหญิงตั้งครรภ์เดี่ยวที่เข้ารับการเจาะน้ำคร่ำเพื่อตรวจจำนวนแท่งพันธุกรรมเนื่องจากผลการตรวจคัดกรองความเสี่ยงของทารกในครรภ์จำนวนแท่งพันธุกรรมผิดปกติให้ผลบวกเพิ่มมากขึ้น อัตราการสูญเสียทารกภายใน 14 วัน ภายหลังการเจาะน้ำคร่ำประมาณร้อยละ 0.12 อัตราการเกิดถุงน้ำคร่ำรั่วภายหลังการเจาะน้ำคร่ำร้อยละ 0.1*
สรุป: *อัตราการสูญเสียทารกภายใน 14 วัน ภายหลังการเจาะน้ำคร่ำเพื่อตรวจจำนวนแท่งพันธุกรรมแก่หญิงตั้งครรภ์เดี่ยวในช่วงไตรมาสที่สองของการตั้งครรภ์ที่หน่วยเวชศาสตร์มารดาและทารกในครรภ์ ภาควิชาสูติศาสตร์และนรีเวชวิทยา โรงพยาบาลสงขลานครินทร์ลดลงกว่าช่วง 10 ปีแรกของการให้บริการ แต่อย่างไรก็ตามการให้คำแนะนำปรึกษาก่อนการเจาะตรวจยังคงมีความจำเป็นอย่างมาก*