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=ABSTRACT=

Factors associated with fetal losses after mid-trimester amniocentesis

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Objective: To evaluate factors associated with fetal losses following mid-trimester diagnostic amniocentesis.

Methods: 412 pregnancy outcomes following amniocentesis were analyzed for each variables(maternal age, gestational age, indication for the amniocentesis, placental penetration by aspiration needle, needle touch by the fetus, color of amniotic fluid) with statistical methods(student t-test, chi-square test and multiple logistic regression test).

Results: Mean maternal age was 31.8±4.9 years, fetal loss rate was increased slightly with the age of the mother. If the indications were abnormally high maternal serum alpha-fetoprotein level, the pregnancy courses after the procedure were worse than other indication groups. In cases of discolored amniotic fluid, the dark brown discoloration made the pregnancy outcome poor. Gestational age at the time of the procedure, penetration of the placenta by the aspirating needle, needle touch during the procedure by the fetus, did not influence the outcomes after the procedure.

Conclusion: Maternal age, indication as neural tube defect in triple test and dark brown discoloration of amniotic fluid are associated with fetal losses following mid-trimester diagnostic amniocentesis.

Key words : Amniocentesis, fetal loss

412

0.3%-1%

^{1,2,3}

1.

1996 12 1998 8 21 가

503

412

: 2000. 1. 31.

412 20 , 44 22G
 31.8 13
 27 19.3 ml
 (triple test) 가 가 , 16 20-30ml
 227 가 0.5 1 ml
 167 , 가 가 50 , 1
 가 가 10 , 35 , 30
 가 119 , 35 가 , ,
 가 28 , 가 가 , ,
 , 가 가 2 .
 .(Table 1) alpha-fetoprotein ,
 acetyl-choline esterase
 1. 가 . 37 , 5% CO₂
 13 27 10
 (biparietal diameter), (metaphase) Giemsa-trypsin banding
 (abdominal circumference), (femur length) 20
 , 7
 4
 , 1 ,
 10cc .

Table 1. Indications of amniocentesis and their outcomes

Indication	No (%)	TOP	early fetal loss	late fetal loss
Advanced maternal age(≥ 35)	119(28.9%)	6	2	4
Previous major anomaly offspring	23(5.6%)		1	1
Major anomaly in close family member	3(0.7%)			
Recurrent miscarriage	3(0.7%)			
FDIU of unknown etiology	3(0.7%)			
Abnormal sonographic finding	28(6.8%)	16		
Abnormal triple maker screening				
<i>high Down syndrome risk</i>	167(40.5%)	8		1
<i>high NTD risk</i>	50(12.1%)	2	2	8
<i>high Edward syndrome risk</i>	10(2.4%)	1		
Anxiety	6(1.5%)			
Total	412(100%)	33	5	14

TOP;termination of pregnancy
 early fetal loss;fetal loss within 28days, late fetal loss;fetal loss after 28days,
 FDIU; fetal death in utero, NTD; neural tubal defect

503 가
 , 3 91 19.4 18.9 가
 (18.1%) . 33 2.
 , 4
 4 , 28 16
 . 가 ,
 , ,
 , (holoprosencephaly) 2 , probosis가
 , gastrochisis, omphalocele 3 ,
 가 Student (multicystic
 t-test, Chi-square test, Fisher's exact test, multiple logistic regression test
 SAS 6.01 dysplastic kidney ,
 (hydrops fetalis) ,
 가가 .

412 , AFP 가
 가 33 (8%) 2
 379 19 (5.0%) 48 10
 .(Table 2, Table 4)
 3.
 1. (가 2 , 9
) 가 3 , 13 1 ,
 412 20 , 44 11 가 ,
 31.8 . 3 , 5 (Cri du chat
 360 31.6 syndrome) 1 ,
 19 32.4 X(47,XXX)가 1 17
 .(Table 2).

Table 2. Pregnancy outcomes of maternal age and gestational age factors

	normal outcome (n=360)	fetal loss (n=19)	T-test (P-value)
Maternal Age (years)	31.6 ± 4.9	32.4 ± 6.0	>0.05
Gestational Age (weeks)	19.4 ± 2.2	18.9 ± 2.0	>0.05

normal outcome; alive baby over 4 weeks of age

Table 3. Placental penetration during amniocentesis.

	normal outcome(No.)	fetal loss(%)	P-value
not penetrated (n=301)	285	16(5.3%)	>0.05
penetrated (n=78)	75	3(3.8%)	

Statics by Fisher's exact test

7.

19

4. 12 154
(63%), 7 (27%)

가 86 (20.9%),
가 326 (79.1%) 86
8 78

8. 78 3 (3.8%)
326 25

301 가
(Table 5)

301 16 (5.3%)
(Table 3)

2 ,
가 (2.3%)

4 vs 1.2%)
6 1.99% 1 1.28%

1966 Steele⁴

5. 1976 NICH²
3.5% 3.2%

가 가²

가 가^{1,5}

6 , 1 379 19
(5.0%)

5 (50%), AFP 가
364 14 (3 MoM , 2.5 MoM 가)
(3.9%) 50

6. 가
NICH² 2.71%
3.5% 4.7%
6 (15%) 15 2.0% 2.5%

0.21%-0.51%

Table 4. Pregnancy outcomes of NTD risk factors and color of amniotic fluid.

	normal outcome(No.)	fetal loss(%)	P-value
Indication			
High NTD risk(n=48)	38	10(20.1)	<0.01
Other indications(n=331)	322	9(2.8)	
Color of amniotic fluid			
Dark brown(n=10)	5	5(50.0)	<0.01
Normal(n=364)	350	14(3.9)	

NTD; neural tubal defect
Statics by X²-test

Table 5. Factors affecting complications after amniocentesis.

		SE	O.R	95% C.I	P-value
Maternal age	0.15	0.07	1.17	1.02-1.33	<0.05
Gestational age	-0.2	0.14	0.82	0.63-1.08	-
Indication	2.57	0.74	13.03	3.08-55.4	<0.05
Penetration	0.1	0.66	1.1	0.3-4.0	-
Discolored A.F	2.32	0.69	10.21	2.62-39.77	<0.05

Indication (0:others, 1:high NTD risk)
 Penetration: Placenta penetration (0:no penetration, 1:penetration)
 A.F: amniotic fluid (0:normal color, 1:dark brown color)
 -: P-value over 0.05

AFP 가 , , 가 . , 78 20.6%,
 , , 301 79.4%
 , 3.8% 5.8% 가 (Table
 3.)
 가 7,17,21,22,
 23,
 . AFP 가 가
 가 가 11, 22G
 , 50 . 2
 2 (Table 4).
 4 (80%) 7 1.86%
 가 Robin⁸ 1.2%
 , 가 6 가
 412 19.3 가 3
 (Table 1). 14 ,
 16 19 가 , (talipes
 equinovarus) 가 , 9,24 가 10
 25 가 가
 6 가 8
 가 2 가 6,7
 12,13,14 1%

7% 15, 16, 18 가 150
 30% 가 7 (37%) 26%(5)가
 7, 16, 20, 27 가
 16, 17 가

405nm

Allen¹⁶

triple test

가 multiple

logistic regression test

가

가 18 -20

, 20

10 , 1 2.67%
 (3.9%)

11
 (50%)

1 10 5
 1
 .5 4 가 4
 가

가

가 ,

가

503
 , 412 (82%)

10 8

triple test

가 가
 AFP 가

가 가 (16%),
 (50%)

가 ,
 가

6 (15%)

Susan¹⁸

9%

가

가 ,
 가

가

(63%)

150

412

12

7 (37%)

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503 412 , Student t-test,
chi-square test, multiple logistic regression test
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