International Journal of Clinical Obstetrics and Gynaecology

ISSN (P): 2522-6614
ISSN (E): 2522-6622

www.gynaecologyjournal.com
2023; 7(2): 05-07
Received: 03-12-2022
Accepted: 07-01-2023

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Assessment of indications and peri-procedural complications of amniocentesis

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DOI: https://doi.org/10.33545/gynae.2023.v7.i2a.1277

Abstract
Aim: Assessment of indications and peri-procedural complications of amniocentesis.
Materials and Methods: Cases were analyzed with some indications such as intermediate or high risk in dual and quadruple marker test, abnormal NT scan or target scan, history of child with congenital anomaly, abnormality in ultrasonography (cystic hygroma, omphalocele, diaphragmatic hernia, etc.) and to which amniocentesis will be applied. Patient and family were informed about the amniocentesis procedure, the role of this method in diagnosis and also its complications before the application.
Results: The age and gestational age of the participants were 28.25±2.69 and 16.89±2.15 respectively. Most of the patients 17.14% have Hypothyroidism co morbidity. 65.71% patients show high risk assessment with dual marker & quadruple marker & abnormal NT scan & target scan indication for amniocentesis, followed by h/o child with congenital anomaly (14.2%), couple has thalassemia (11.4%), genetic disorder in family (2.9%) and chromosomal abnormality in previous child (2.9%). There was no complication of amniocentesis.
Conclusion: we concluded that the genetic amniocentesis has a high success rate when performed by experienced obstetrician or foetal medicine specialist in 15-20 weeks of gestation. It should be offered to the patients when they have correct indication.

Keywords: Amniocentesis, NT scan, hypothyroidism

Introduction
Amniocentesis is prenatal diagnostic test which is invasive and provides information regarding fetal karyotype, chromosomal abnormalities, genetic defect, inborn error and fetal sex (prohibited in India). It is done during early second trimester of pregnancy. It is an outpatient procedure which may or may not include the use of local anesthesia. This procedure is carried out by obtaining a sample of amniotic fluid from the pregnant woman. Procedure related complications include miscarriage, infection, placental puncture etc [1]. Indications of amniocentesis include maternal age above 35 year, abnormal ultrasound or lab screen results, family history of certain birth defects, abnormal genetic test results in current pregnancy, history of recurrent abortions, history of chromosomal abnormality in previous pregnancy, abnormal karyotype in couples, history of infant delivery with multiple major malformation [2]. Even though amniocentesis is a reliable diagnostic method, but it does not detect all birth defects, also it causes certain complications. These complications are inversely proportional to the experience of the person who applies the method. Amniotic fluid leak, vaginal bleeding, uterine contractions, chorioamnionitis, sampling failure, miscarriage, fetal loss and possible fetal injuries are among the complications of amniocentesis [3].

Materials and Methods
This study is Observational study of outcome of various parameters in the antenatal patients who was visited SAIMS and its attached hospital during 1st April 2021 to 30th September 2022. Each patient fulfilling the inclusion criteria were included in the study. Informed written consent was taken. A pre structured proforma was used to collect the baseline data. Cases were analyzed with some indications such as intermediate or high risk in dual and quadruple marker test, abnormal NT scan or target scan, history of child with congenital anomaly, abnormality in ultrasonography (cystic hygroma, omphalocele, diaphragmatic hernia, etc.) and to which amniocentesis will be applied.

Patient and family were informed about the amniocentesis procedure, the role of this method in diagnosis and also its complications before the application. Sonography was done for localization of placenta before the procedure.

Inclusion criteria

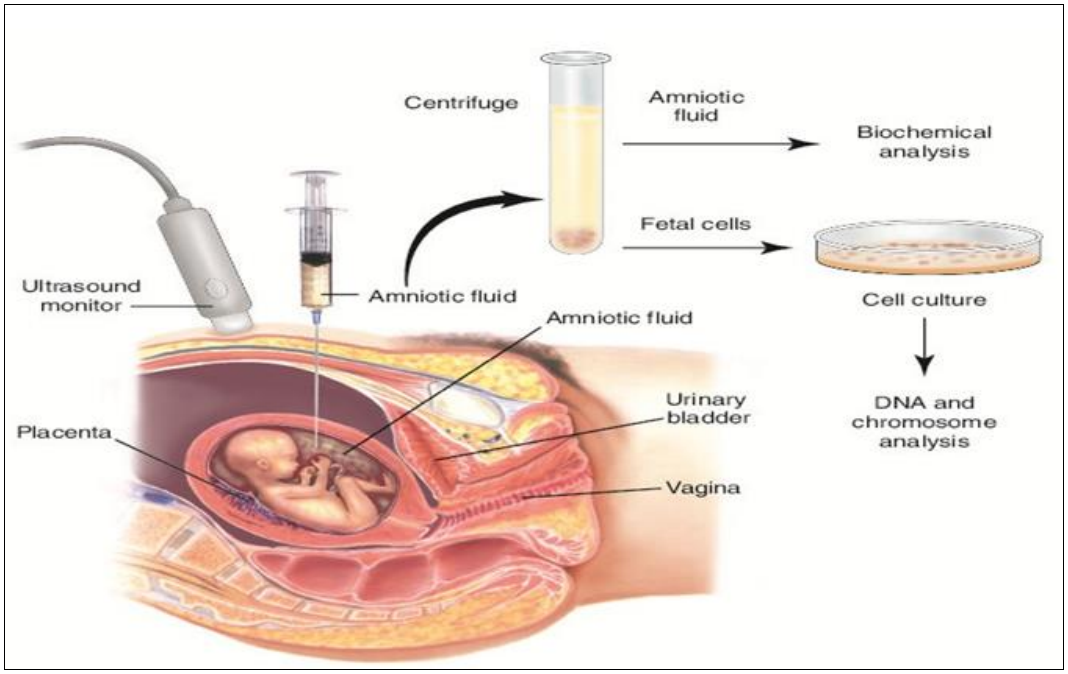
- Abnormal genetic test result.
- Intermediate or high risk assessment with dual marker and quadruple marker.
- History of previous child with birth defect or family history of birth defect.
- Abnormal ultrasound findings.
- Who have complications like hydrops fetalis, IUGR, prenatal infection etc.
- Abnormal karyotype in couples.

Exclusion criteria

- Patients not giving consent for the procedure.
- Period of gestation above 20 weeks.
- Women infected with hepatitis B & HIV.

Methodology

Patient in supine position followed by abdomen exposed and cleaned with antiseptic solution, Ultrasound done to locate the position of placenta, position & movements of fetus & characteristics of amniotic fluid in uterus. Under ultrasound guidance, position of fetus is monitored & a long needle (20-22 gauge) is carefully inserted through abdomen & uterus into the amniotic sac. Without puncturing the placenta & fetus, approximately 20 ml of amniotic fluid is aspirated. Sample is sent to laboratory for analysis where it is centrifuged to separate fetal cells From 20 ml amniotic fluid, first 2ml is discarded due to its mixing with maternal blood cells, to ensure high quality sampling. Fetal cells are separated & placed in culture medium that stimulates them to grow & divide. It is then fixed & stained & various tests are performed which include chemical analysis, DNA analysis, chromosomal analysis etc. Puncture seals & amniotic sac replenishes the liquor over next 24-48 hours.



Results

The age and gestational age of the participants were 28.25±2.69 and 16.89±2.15 respectively. Most of the patients 17.14% have Hypothyroidism co morbidity. 65.71% patients show high risk assessment with dual marker & quadruple marker & abnormal NT scan & target scan indication for amniocentesis, followed by h/o child with congenital anomaly (14.2%), couple has thalassemia (11.4%), genetic disorder in family (2.9%) and chromosomal abnormality in previous child (2.9%). There was no complication of amniocentesis.

Table 1: Shows Basic parameter, number and Percentage

Basic parameter	Number	Percentage
Age	28.25±2.69	
Gestational age	16.89±2.15	
Conception		
Spontaneous	26	74.28
IVF/IUI	2	5.71
Ovulation Induction (OI)	7	20
Comorbidity		
Hypothyroidism	6	17.14
Thalassemia minor	1	2.86
Diabetes	1	2.86
HTN	1	2.86

Table 2: Indications and rates of amniocentesis

Indications	n	%
High risk assessment with dual marker & quadruple marker & abnormal NT scan & target scan	23	65.71
H/o child with congenital anomaly	5	14.2
Couple has thalassemia	4	11.4
Genetic disorder in family	1	2.9
Chromosomal abnormality in previous child	1	2.9
Total	35	100

Table 3: Periprocedural complications of amniocentesis

Complications	N	Percentage (%)
Miscarriage	0	0
Fetal loss before 24 weeks	0	0
Infection	0	0
Injury to fetus	0	0
Placental puncture & bleeding with secondary damage to fetus	0	0
Amniotic fluid leak	0	0
No complication	35	100
Total	35	100

Discussion

Amniocentesis is a procedure in which amniotic fluid is extracted through the amniotic sac and is the most common method to detect genetic disorders in the fetus. A personal history of a previous child or fetus diagnosed with chromosomal abnormality poses an independent indication for amniocentesis. This is derived and supported by data reporting increased risk of recurrence in subsequent pregnancies [4]. Warburton *et al*. investigated the risk for trisomy recurrence combining the data from large databases. In our study 28 patients had spontaneous conception, 6 patients had conception by ovulation induction and only 1 patient had IVF conception. Bonduelle *et al*. investigated 1586 fetuses conceived by supported reproduction methods like IVF or IUI and found a significantly higher rate of inherited chromosomal abnormalities in these cases, compared to the general population [5]. In our study amniocentesis was performed under all aseptic precautions using 22 gauge needle. Procedure was done under ultrasound guidance. Based on the findings of previous studies, transplacental needle passage increases the risk of contamination with blood. Therefore, the passage of the needle through the placenta or at the placental cord insertion site should be avoided, unless it is the only alternative to safely access an adequate amniotic fluid pool [6].

Amniocentesis is costly, invasive test that can lead to certain complications, hence not all patients give consent for the procedure. Also, it does not detect all birth defects such as cleft palate and lip, club foot, heart defects etc. Even chromosome result is normal, it does not guarantee a normal baby.

Conclusion

As a result, although it might lead to serious complications including foetal loss, amniocentesis is the most commonly and easily performed, and reliable invasive test for prenatal diagnosis of genetic disease. Genetic amniocentesis has a high success rate when performed by experienced obstetrician or foetal medicine specialist in 15-20 weeks of gestation. It should be offered to the patients when they have correct indication**.**

Conflict of Interest

Not available

Financial Support

Not available

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How to Cite This Article

Wilson A, Bhandari S, Chandwaskar N, Wilson A. Assessment of indications and peri-procedural complications of amniocentesis. International Journal of Clinical Obstetrics and Gynaecology. 2023;7(2):05-07.