

Ultrasound evaluation in cases of medical termination of pregnancy with gestational age more than 20 weeks.

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Abstract

Background: Ultrasound is a modality of choice for obstetric assessment. It plays an important role in early detection of fetal malformations. The sensitivity of the ultrasound is high in the diagnosis of these malformations. It also helps in knowing the prognosis, hence useful for follow up. In India, MTP was not allowed beyond 20 weeks without court permission. That's why USG evaluation of females for MTP with gestational age >20 weeks to look for the spectrum of fetal malformations contributing to termination is important.

Purpose of study: To study the spectrum of fetal malformations on ultrasound in MTP cases more than 20 weeks of gestation.

Result and discussion: CNS was the most commonly involved system (35% cases) in fetal malformation, followed by CVS (22% cases) and GUT (14% cases) respectively. CNS malformations (34 cases) were the

most contributing to MTP in more than 20 weeks of gestation followed by CVS (21 cases).

Conclusion: Ultrasound plays an important role in detection of fetal malformations. Fetal malformation is main factor for MTP in cases of GA >20 weeks. 89% cases were terminated.

Keywords: MTP, Fetal malformations, anomaly, USG, Gestational age.

Introduction

Ultra sono graphy is the modality of choice for radiological obstetric examination It has an ability to detect pregnancy as early as 5 weeks by transvaginal ultra sono graphy. Fetal malformation can be diagnosed antenatally by ultrasound examination. The second trimester ultrasound is very important because several malformations develop later than the first trimester¹.

USG also helps in knowing the prognosis, hence useful for follow up. The team work and communication

between the obstetrician and paediatrician and the radiologist shows better result in patient management.

The fetal anomaly scanning by ultrasonography is usually done in 12 to 13 weeks followed by follow-up examination at 18 to 22 weeks, since all fetal malformations cannot be detected in first trimester². Few fetal malformations need follow up scanning after 20 weeks. It is important to note that all the USG picked anomalies may not necessarily have chromosomal abnormalities. The status of amniotic fluid may also sometimes compromise the USG study⁴.

Here we studied ultra sound evaluation in females for medical termination of pregnancy (MTP) with gestational age more than 20 weeks to look for fetal malformations spectrum. In India, as per MTP act 1971, medical termination of pregnancy (MTP) was allowed up to 20 weeks of gestational age. However according to the Medical Termination of Pregnancy Amendment Act 2021, pregnancy between 20 to 24 weeks can be terminated with two doctors' consent. Special categories of women, such as rape/incest victims, differently-abled women, and minors, are granted such extension of the gestation period³. If there are significant foetal abnormalities, a State level Medical Board will evaluate whether abortions after 24 weeks are permissible or not. In our study the major factor responsible for MTP in patients with gestational age more than 20 weeks was fetal malformations. Thus fetal malformations and their spectrum is studied and discussed here.

Aims and objectives

To study the spectrum of fetal malformations with ultrasound in females with gestational age more than 20 weeks for MTP.

Methods and material

Inclusion criteria

The study included 100 cases having gestational age of >20 weeks seeking for medical termination of pregnancy. Prior written informed consents were taken.

Exclusion criteria

1. Pregnancy cases having gestational age less than 20 weeks
2. Patient not willing for consent
3. Highly irritable patients

Instrumentation

GE Logiq P9 USG machine was used for obstetric ultrasound examination of study cases. It has 3 probes:

1. 3.5-5 MHz Curvilinear probe
2. 8-12 MHz linear probe
3. 2-5 MHz TVS probe

Scanning technique

Patient lying in supine position and anterior abdomen was draped with jelly. A systemic and sequential approach was used before that general scanning performed

1. Fetal head was scanned first.
2. Then the longitudinal and transverse views of the spine.
3. A short axis view at chest.
4. Abdominal circumference view showing the stomach and umbilical vein.
5. Transverse and long view of kidneys.
6. Views of the cord insertion.
7. Bladder views (longitudinal view to include stomach and heart)
8. Femur views and evidence that all extremities are present
9. A sweep through the entire fetus and an informal biophysical profile

10.Placental site and fetal lie.

11.Fetal movements and cardiac activity.

12.Measurements BPD, FL, AC and it require additionally humerus and foot length.

After thorough scanning diagnosis is made about fetal malformation.

Results

Table 1: Distribution of fetal malformations according to age of pregnant females

Maternal age (In years)	No. of cases with positive findings	Percentage
18-20	15	15
21-25	47	47
26-30	27	27
>30	11	11
Total	100	100

According to above table, maximum cases were present in females in 21-25 years age group i.e., 47% followed by 26-30 years being 27%. 15% & 11% in age group of 18-20 years and >30 years respectively.

Table 2: Distribution of cases according to history of consanguinity of female with fetal anomalies

History of consanguinity	No. of fetal anomaly	Percentage
YES	19	19
NO	81	81
TOTAL	100	100

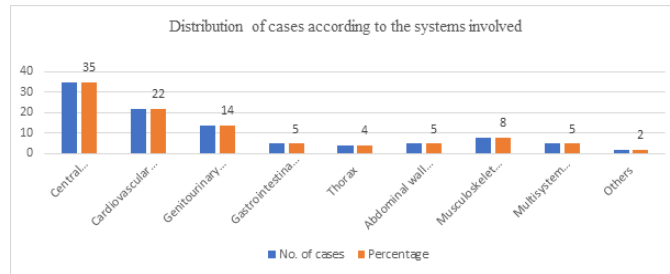
Cases associated with history of consanguinity were 19% in our study. Rest of 81% cases had no history of consanguinity.

Table 3: Distribution of cases according to the systems involved

System involved	No. of cases	Percentage
Central nervous system	35	35
Cardiovascular system	22	22
Genitourinary system	14	14
Gastrointestinal system	5	5
Thorax	4	4
Abdominal wall defects	5	5
Musculoskeletal system	8	8
Multisystem involvement	5	5

Others	2	2
Total	100	100

Figure 1:

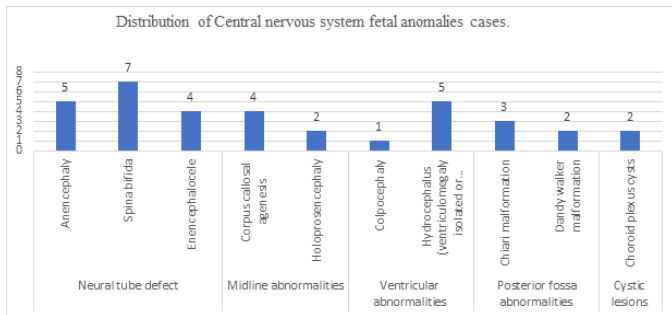


In our study, most common system involved is Central nervous system, contributing for 35%, followed by cardiovascular & genitourinary system – 22% & 14%. Gastrointestinal system, multisystem & abdominal wall defect anomalies being 5% each. Thorax & Musculo skeletal system contributing to 4% & 8% respectively. 2% cases were included under other category and 5% in multisystem involvement.

Table 4: Distribution of Central nervous system fetal malformations cases

CNS anomaly group	CNS anomaly	No. of cases	Percentage
Neural tube defect	Anencephaly	5	14.2
	Spina bifida	7	20
	Encephalocele	4	11.4
Midline abnormalities	Corpus callosal agenesis	4	11.4
	Holoprosencephaly	2	5.8
Ventricular abnormalities	Colpocephaly	1	2.8
	Hydrocephalus (ventriculomegaly isolated or associated)	5	14.2
Posterior fossa abnormalities	Chiari malformation	3	8.6
	Dandy walker malformation	2	5.8
	Choroid plexus cysts	2	5.8
Total		35	100

Figure 2:



In our study, according to table & figure: neural tube defect is the most common finding contributing to 45.6% of CNS cases with 20% cases of spina bifida, 14.2% cases anencephaly. Midline abnormalities like corpus callosal agenesis & holoprosencephaly contributing to 11.4% & 5.8% cases. 17% cases were ventricular abnormalities. 8.6% cases were Chiari malformations and 5.8% cases were Dandy walker malformation.

Table 5: Distribution of cardio vascular system fetal anomaly cases

CVS anomaly	No. of cases	Percentage
Hypoplastic left heart syndrome	7	32
Complex congenital heart disease	3	14
VSD(isolated or associated)	6	27
Vascular anomalies (isolated)	5	23
Other	1	4
Total	22	100

Distribution of cardiovascular system fetal anomaly cases according to above table show: hypoplastic left heart being the most common CVS anomaly contributing to 32% cases, followed by Ventricular septal defects (27%), isolated vascular anomalies (23%), complex heart disease (14%)

Table 6: Distribution of genitourinary system fetal anomaly cases

GUT anomaly	No. of cases	Percentage
Renal agenesis	7	50
PUJ obstruction/ Hydro nephrosis	2	14
Renal cystic disease	4	29
Bladder outlet obstruction	1	7
Total	14	100

Distribution of genitourinary system fetal anomaly cases in above table: majority of cases are renal agenesis contributing 50% cases, followed by renal cystic disease (29%), Pelvi-ureteric junction obstruction/ hydro nephrosis (14%) and bladder outlet obstruction (7%)

Table 7: Distribution of musculoskeletal system fetal anomaly cases

MSK anomaly	No. of cases	Percentage
Skeletal dysplasia	4	50
Club foot	3	37
Other	1	13
Total	8	100

As per above table, maximum no. of cases in Musculo skeletal system anomalies are skeletal dysplasia accounting for 50% cases, followed by club foot (37%) and other (13%)

Table 8: Distribution of Gastrointestinal system fetal anomaly cases

GIT anomaly	No. of cases	Percentage
Oesophageal atresia	1	20
Ileal atresia	2	40
Gut malrotation	1	20
Diaphragmatic hernia	1	20
Total	5	100

Distribution of Gastrointestinal system fetal anomaly cases as per above table: Ileal atresia contributes to

majority of GIT anomaly cases (40%), Rest of anomalies of GIT, i.e., oesophageal atresia, gut malrotation form 20% cases each.

Table 9: System wise pregnancy outcome in females with anomalous fetus

System involved	No. of cases	Termination allowed	Termination not allowed
Central nervous system	35	34	1
Cardiovascular system	22	21	1
Genitourinary system	14	14	-
Gastrointestinal system	5	5	-
Thorax	4	4	-
Abdominal wall defects	5	1	4
Musculoskeletal system	8	5	3
Multisystem involvement	5	5	-
Others	2	-	2
Total	100	89	11

Cases with GUT, GIT, thorax & multisystem anomalies all were allowed for termination. 97.2% cases of CNS, 95.4% of CVS, 62.5% of musculoskeletal and 20% of abdominal wall defect were allowed for termination. Total 11 cases (11%) were not allowed for termination include one from each of CVS & abdominal wall defect anomalies, 4 cases with abdominal wall defects, 3 cases with Musculo skeletal anomalies and 2 were in other category.

Discussion

In our study total 100 females with gestational age more than 20 weeks seeking for MTP were included. About maternal age, in our study maximum number of cases were found in females with age between 21-25 years (47%), followed by 26-30 years age group. Less number of cases were found in < 20 years. The maternal age remains the main factor affecting over incidence of fetal mal formations leading to termination. Hollier et al. evaluated the association between congenital major anomalies and maternal age and reported a significantly higher incidence of fetal malformations in women aged over 25 years than in women aged less than 20 years⁵. According to a study carried out by Dr. Salma et al mean gestational age undergoing termination of pregnancy was 22 ± 4.5 weeks. The mean age of female undergoing termination of pregnancy was 27.17±5.3 years⁶.

The consanguinity was seen in 19% cases in our study. Rest of 81% cases had no history of consanguinity. It is major factor responsible for occurrence of fetal mal formations leading to medical termination of pregnancy. As per the study by Rittler et al⁷ significant association with consanguinity was found for hydrocephalus, cephalocele, microcephaly, bilateral cleft lip/palate, hand postaxial polydactyly, hand or foot postaxial polydactyl ly, 2-3 syndactyly, hydrops fetalis, and Down syndrome with maternal age of 35 years or older. According to Bromiker et al⁸ prevalence of fetal malformations was more with consanguineous marriages. As per the study carried out by Jesrani A et al⁹ consanguinity rate in the study was 64% in view of prevalence of fetal mal formations.

In our study, most common system affected in fetal anomaly was central nervous system 35% cases followed by cardiovascular system 22% cases. CNS contributes to majority of cases. According to Gowada et

al study¹⁰ on antenatal classification of fetal anomalies most common system to involve was the nervous system (21.3%) followed by circulatory system (20.7%) and musculoskeletal systems (16%). 97.2% cases of CNS anomalies underwent termination in our study. According to Dr. Salma et al⁶, maximum cases of fetal anomalies leading to termination of pregnancy were central nervous system cases contributing to 60% of total cases. Further analysis showed that Central nervous system anomalies for which pregnancy termination was carried out includes hydrocephalus 40%, anencephaly 28%, fetal acrania 12%, dandy walker syndrome 10% and holoprosencephaly 8%.

In present study most common central nervous system fetal anomaly was spina bifida (20%) followed by anencephaly & hydrocephalus (14.2%) each. According to Sarah W. Cater et al study of CNS fetal anomalies, most common anomaly was neural tube defect which includes spina bifida, anencephaly etc.

Second most common system to involve was cardiovascular system (22%) with most common finding being Hypoplastic left heart (32%). As per a study by Rajiah et al¹¹ the most common cardiovascular fetal malformation was ventricular septal defect seen in 1.5 to 3.5 per 1000 live births accounting for 30% cardiovascular fetal malformations. According to Qui et al¹² 63.4% cases of cardiovascular system fetal malformations were terminated.

In our study the most common fetal renal malformation was renal agenesis (50%) followed by 29% renal anomalies were cystic diseases of kidney. Ultrasound examination should be done at after 20 weeks also since cystic kidney diseases may not be visible ultrasonically at 20 weeks; therefore, repeat scan may be indicated around 28–30 weeks in high-risk groups. Bilateral renal

agenesis is fatal condition, termination is needed. (T. Dias et al.)¹³ The most common presentation is anhydramnios in case of renal agenesis¹⁹

In present study, fetuses with musculoskeletal anomalies 5 out of 8 were terminated (62.5%). Most common fetal musculoskeletal malformation was skeletal dysplasia (50%) followed by club foot. For musculoskeletal fetal anomalies follow up scan after 20 weeks is necessary. As per study by Keret et al¹⁴ severe length and shape abnormalities can be detected after 23 weeks of gestation (e.g., achondroplasia) 89% fetuses with fetal anomalies were allowed for termination. Some skeletal defects, however, cannot be detected at the early scanning and should be followed with an additional detailed ultrasonographic scanning between 18 and 24 weeks of pregnancy, even when there is no reason to suspect the existence of an abnormality

In our study, GIT anomalies most common was ileal atresia (40%) followed by oesophageal atresia (20%). Milan stanojevic et al. study¹⁵ of ultrasound in GIT fetal anomalies showed detection of Oesophageal atresia (13.4%) in the study of 38 patients. While some studies have noted that obstructive anomalies cannot be diagnosed until later in pregnancy (>24 weeks), because the fetus swallows smaller amounts of fluid in early pregnancy, compared with later pregnancy¹⁸

Total 89% of cases were terminated. Remaining 11% cases were not allowed for termination by the medical board.

In new amendments 2021 few changes were done³. One of the most notable elements of this bill is that it allows abortion up to 20 weeks based on the judgement of just one medical practitioner¹⁶. Termination can be done for gestational age between 20 to 24 weeks for that two doctors' consent is required¹⁷. If there are significant

foetal abnormalities, a State level Medical Board will evaluate whether abortions after 24 weeks are permissible or not. It is board which decides whether medical termination of pregnancy to be allowed or not. Those females who are not allowed to terminate need carry forward the current pregnancy. If abortions are requested to end pregnancies resulting from rape and the gestation period is more than 24 weeks, the only option is to file a writ petition.

In our study, before MTP act amendment 2021 the females with gestational age more than 20 weeks willing for medical termination of pregnancy with court order were more in number. However, after the new amendment court order was needed only in case of medical termination of pregnancy in more than 24 weeks of gestation

Conclusion

Ultrasound plays an important role in detection of fetal malformations. In present study fetal malformations were the major cause for medical termination of pregnancy in more than 20 weeks of gestation. In spectrum of fetal malformations, the central nervous system was the most commonly involved system followed by cardiovascular system and genitourinary system. The central nervous system anomalies (34 cases) were the most contributing to medical termination of pregnancy in more than 20 weeks of gestation followed by cardiovascular system (21 cases). Total 89% cases were terminated.



Figure 1: USG shows absence of cranial vault & brain parenchyma above the orbits giving frog eye sign – anencephaly (arrow)



Figure 2: Post medical termination of pregnancy – anencephaly (arrow)



Figure 3 : shows left hypoplastic heart (arrow).

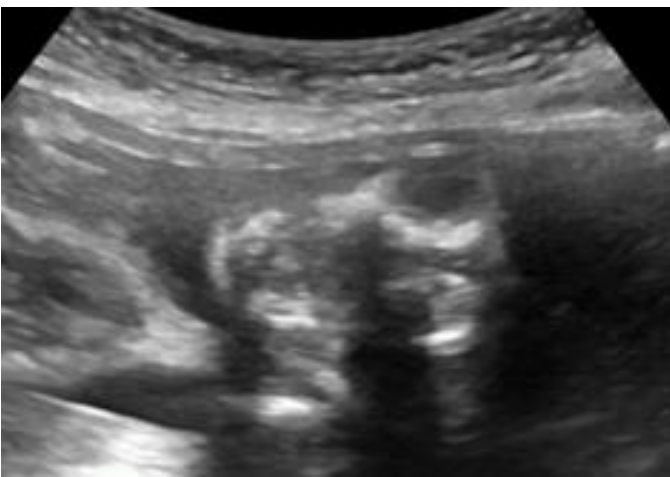


Figure 4: Sagittal ultrasound showing a heteroechoic solid-cystic mass (arrow) in sacrococcygeal region – sacrococcygeal teratoma (arrow)



Figure 5: Post MTP: abortus fetus with sacrococcygeal teratoma (arrow)

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Abbreviations

CNS: Central nervous system

CVS: Cardiovascular anomalies

MTP: Medical termination of pregnancy

GA: Gestational age

GIT: Gastrointestinal tract

GUT: Genitourinary tract

USG: Ultrasonography.