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Late Termination of Pregnancy: A Retrospective Evaluation of 243 Pregnancies In A Tertiary Medical Center

Gebeliğin Geç Sonlandırılması: Üçüncü Basamak Bir Tıp Merkezinde 243 Gebeliğin Retrospektif Olarak Değerlendirilmesi

ABSTRACT

Objective

This study aims to assess changes in the indications for late termination of pregnancy performed after 24 weeks of gestation over the years.

Material and Methods

We performed a retrospective analysis of a cohort who requested late termination of pregnancy after a diagnosis of fetal abnormality at the Department of Obstetrics and Gynecology, Akdeniz University Faculty of Medicine, between January 2007 and December 2022. The cases were divided into two groups with 8-year time intervals: Group 1 spanning from January 2007 to December 2014, and Group 2 spanning from January 2015 to December 2022.

Results

A total of 243 cases were evaluated in the analysis, with 127 (52.3%) cases in Group 1 and 116 (47.7%) cases in Group 2. Over the past sixteen years, the most frequent reasons for late termination of pregnancy involving fetuses were central nervous system malformations (43.2%), cardiovascular system anomalies (17.3%), and chromosomal abnormalities (11.1%). A significant increase was noted over the course of time in the percentage of instances presenting cardiovascular system anomalies and chromosomal abnormalities ($p<0.05$).

Conclusion

This analysis provides insight into the causes of late termination of pregnancy. Especially in the third trimester, central nervous system anomalies are an important cause of late termination of pregnancy. In addition to standard second-trimester anatomical scanning, limited first-trimester anatomical scanning and third-trimester neurosonogram will contribute to the diagnosis of fetal anomalies. In conclusion, expanding screening strategies will also reduce the need for late termination of pregnancy due to fetal abnormalities.

Key Words

Congenital Malformation, Fetal Death, Feticide, Termination of Pregnancy

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ÖZ

Amaç

Bu çalışma, 24. gebelik haftasından sonra yapılan geç gebelik terminasyonu endikasyonlarının yıllar içindeki değişimini değerlendirmeyi amaçlamıştır.

Gereç ve Yöntemler

Akdeniz Üniversitesi Tıp Fakültesi Kadın Hastalıkları ve Doğum Anabilim Dalı'nda Ocak 2007 ile Aralık 2022 tarihleri arasında fetal anormallik tanısı sonrası geç gebelik terminasyonu talep eden bir kohort retrospektif olarak değerlendirildi. Olgular 8 yıllık zaman aralıklarındaki vakaları içeren iki gruba ayrıldı: Ocak 2007'den Aralık 2014'e kadar olan olgular Grup 1 ve Ocak 2015'ten Aralık 2022'ye kadar olan olgular Grup 2 olarak tanımlandı.

Bulgular

Analizde Grup 1'de 127 (%52,3) ve Grup 2'de 116 (%47,7) olmak üzere toplam 243 vaka değerlendirildi. Son on altı yılda geç gebelik terminasyonun en sık nedenleri MSS (merkezi sinir sistemi) anomalileri (%43,2), kardiyovasküler sistem anomalileri (%17,3) ve kromozomal anormalliklerdi (%11,1). Yıllar içinde kardiyovasküler sistem anomalileri ve kromozomal anormallikleri olan vakaların yüzdesinde dikkate değer bir artış gözlendi ($p<0.05$).

Sonuç

Bu çalışma, gebeliğin geç terminasyon endikasyonlarının yıllar içindeki değişimine ilişkin bilgiler vermektedir. Özellikle üçüncü trimesterde, MSS anomalileri geç gebelik terminasyonunun önemli bir nedenidir. Standart ikinci trimester anatomik taramaya ilave olarak kısıtlı birinci trimester anatomik tarama ve üçüncü trimester nörosonogramı fetal anomalilerin tanısına katkı sağlayacaktır. Sonuç olarak; tarama stratejilerinin yaygınlaştırılması fetal anormallikler nedeniyle gebeliğin geç sonlandırılmasına olan ihtiyacı da azaltacaktır.

Anahtar Sözcükler

Konjenital Malformasyon, Fetal Ölüm, Fetisit, Gebeliğin Sonlandırılması

INTRODUCTION

Fetal malformations constitute a prominent contributor to perinatal mortality rates. These abnormalities impose enduring disabilities on affected fetuses, necessitating frequent hospitalizations and burdening the healthcare system (1). Advancements in medical technology, along with the widespread implementation of routine prenatal screening procedures such as the nuchal translucency (NT) scan, cell-free fetal DNA testing, triple and quadruple screening, and detailed obstetric ultrasound scan, as well as diagnostic tests like chorionic villus sampling (CVS) and amniocentesis (AS), have facilitated the identification of diverse fetal abnormalities during pregnancy, encompassing structural, chromosomal, and other anomalies (2, 3). Termination of pregnancy (TOP) due to fetal structural or chromosomal anomalies typically occurs during the early second trimester, before fetal viability. However, in exceptional cases, termination may be contemplated in late pregnancy, even when the fetus is viable (4, 5). Studies indicate that a significant majority of women facing severe or fatal fetal anomalies during the late second or third trimester opt for pregnancy termination (4, 6). Late TOP refers to the termination of pregnancy that occurs after the 24th week of gestation, which is considered a complex and controversial decision due to the advanced stage of pregnancy. The decision to pursue TOP in cases of severe or fatal fetal abnormalities entails intricate ethical considerations, particularly concerning the fetus's right to life. Some argue that TOP is tantamount to ending the life of a viable fetus and raising significant ethical concerns (7). Moreover, when severe fetal abnormalities are diagnosed late in gestation for parents who had actively desired these pregnancies, the decision to pursue TOP becomes even more complex, entailing processes of grief, loss, and mourning (8, 9).

The rights associated with TOP are established within the framework of laws that can vary depending on the historical, cultural, and political context of different countries (10). In Türkiye, specifically governed by Law No. 2827 enacted in 1983, elective pregnancy termination is permitted within the first 10 weeks of pregnancy (11). However, in cases where pregnancies exceed 10 weeks, termination is permissible without an upper limit on gestational weeks when there is a life-threatening risk to the mother or when a fatal disease is diagnosed in the fetus with no available cure, resulting in severe disability (11).

Accurate data regarding prenatal fetal abnormalities aids in the management of pregnancies complicated by fetal abnormalities, including fetal prognosis assessment, appropriate parent counseling, and challenging decision-making. It helps parents assess the potential risks that may arise post-delivery and determine whether TOP should be considered after reaching the stage of fetal viability (2). For this reason, studies are constantly needed to examine the causes of late TOP, which may change over time (7). This study aims to evaluate the changes over the years in

the indications for late TOP performed after the 24th week of gestation, to identify strategies for reducing the causes of late TOP by enabling earlier detection, and to highlight the importance of third-trimester ultrasound in pregnancy for abnormalities that present with late findings.

MATERIALS and METHODS

Study Design

We performed a retrospective analysis of a cohort of patients who requested late TOP after a diagnosis of fetal abnormality at the Department of Obstetrics and Gynecology, Akdeniz University Faculty of Medicine, between January 2007 and December 2022. Our medical center serves as a tertiary referral center for patients with suspected serious fetal abnormalities. Approval for this study was obtained from the institutional Ethics Committee with approval number KAEK-544. The study was conducted in accordance with the principles stated in the Declaration of Helsinki, which emphasizes ethical considerations in medical research involving human subjects.

Patient Selection

Patients included in the study underwent detailed obstetric ultrasonography (USG) to confirm fetal abnormality. In cases where necessary, additional tests such as genetic analysis (karyotype, microarray, clinical exome sequencing) and magnetic resonance imaging (MRI) were recommended. Subsequent USG and other tests were conducted periodically, taking into account the severity of the abnormality and the gestational age, to assist in the decision-making process regarding TOP. Personalized recommendations were provided to each patient following consultations with various specialized disciplines including genetics, pediatric cardiology, neonatal intensive care, and neurology. A multidisciplinary team evaluated each termination case according to the characteristics of the relevant organ system and following the council decision, patients for late termination were determined. After the family requested TOP and obtained legal approval, the termination report was prepared with the decision of a special committee consisting of 3 physicians working in the relevant branches by the national legal regulations.

Pregnancy Termination Procedure

Following the issuance of the termination report and obtaining legal consent from the family, the process of TOP entailed two sequential steps. Since the pregnancy had surpassed the viability limit, feticide was performed in all cases, preferably through the administration of potassium chloride (KCl) into the fetal heart or umbilical vein, aiming to induce a permanent cardiac arrest. This procedure was meticulously guided by USG to ensure accuracy and efficacy. The second step involved devising a customized birth plan tailored to the patient's obstetric history. We used a 40-cc Foley balloon catheter for cervical preparation for 12 hours. Subsequently, intravaginal misoprostol was administered in accordance with the International Federation of Obstetrics and Gynecology (FIGO) recommendations. Vaginal curettage was added to the procedure when necessary, following the delivery of the fetus. Following the delivery of the fetus, a systematic approach was implemented to document and photograph any congenital malformations present. Additionally, direct radiography of the fetus was arranged if abnormalities associated with the musculoskeletal system were suspected. If legally authorized by the family, a traditional autopsy was conducted. It is noteworthy that all autopsies were conducted by a specialized team of pathologists, adhering to established guidelines and protocols.

Data Collection and Analysis

In this retrospective study, we investigated cases of delayed pregnancy termination over 16 years. The patient data, including prenatal ultrasound findings, MRI findings, CVS and AS results, and autopsy findings, were obtained and stored from the hospital's electronic data system and patient files in accordance with Art. 4 of the Law on the Protection of Personal Data numbered 6698. The cases were divided into two groups with 8-year time intervals: Group 1 spanning from January 2007 to December 2014, and Group 2 spanning from January 2015 to December 2022. Furthermore, to evaluate the indications for third-trimester termination, patients were also divided into two groups 'late second-tsrimester termination (24-28 weeks of gestation) and third-trimester termination (≥28 weeks of gestation)'.

Cases undergoing termination were categorized by the "International Statistical Classification of Diseases and Related Health Problems" ICD-10-GM Version 2020 (last updated 25 May 2020) (12). For comparison, the ICD-10-GM codes were grouped based on the organ systems affected by the malformation or conditions justifying the indication for late termination in each case, including the central nervous system (CNS), cardiovascular system (C-VS) (genetically confirmed DiGeorge syndrome excluded), musculoskeletal system (including diaphragmatic hernia), genitourinary system, chromosomal abnormalities and confirmed microdeletion syndromes (including DiGeorge), amniotic fluid abnormalities, and multi-organ malformations. Organ systems impacted by congenital malformations were considered independent of each other, in the case of multiorgan involvement like heart and/or brain and/or more.

Statistical Analysis

Descriptive statistics were used, to sum up the demographic and clinical characteristics of the study population. Categorical variables were analyzed using frequencies and percentages, while continuous variables were reported as means with standard deviations or medians with interquartile ranges, depending on the distribution. As appropriate, group comparisons were performed using chi-squared tests or Fisher's exact tests for categorical variables, and independent t-tests or Mann- Whitney U tests for continuous variables. A P-value of less than 0.05 was considered statistically significant, with a 95% confidence interval applied for all analyses.

RESULTS

Patient Characteristics

The study group consisted of patients who requested late TOP after a diagnosis of fetal abnormality in our institute, between January 2007 and December 2022. Pregnancies terminated for maternal medical reasons and fetal deaths were excluded. A total of 243 cases were evaluated in the analysis, with 127 (52.3%) cases in Group 1 (2007-2014) and 116 (47.7%) cases in Group 2 (2015-2022). Within our study group, the average maternal age was found to be 30.4 ± 5.3 years. The mean values for patients' gravidity and parity were 2.17 ± 1.2 and 1.02 ± 1.0, respectively. No significant differences were observed between the two groups concerning maternal age, gravidity, and parity. Group 2 exhibited a significantly higher mean gestational age at the time of TOP compared to Group 1. Furthermore, prenatal screening tests and karyotype analysis were conducted more frequently in Group 2, indicating a statistically significant difference (p<0.0001). The demographic and obstetric characteristics of the groups are summarized in Table I.

Table I. Demographic and obstetric characteristics of the pregnant women

	Group 1 (2007-2014)	Group 2 (2015-2022)	Total (2007-2022)	P
The number of TOP	127 (52.3%)	116 (47.7%)	243 (100%)	-
Maternal age (mean±SD), y	29.8±4.9	31.08±5.7	30.42±5.3	P>0.05
Gravidity (mean±SD)	2.03±1.0	2.32±1.3	2.17±1.2	P>0.05
Parity (mean±SD)	1.03±1.0	1.01	1.02±1.0	P>0.05
GA at TOP (≥ 24), weeks	25.99±2.5	25.14±1.8	25.58±2.2	P: 0.007
Screening test, n (%)	33 (26%)	89 (76.7%)	122 (50.2%)	P<0.0001
Prenatal karyotype, n (%)	25 (19.7%)	82 (70.7%)	107 (44%)	P<0.0001
TOP 24-28 w, n (%)	90 (70.9%)	99 (85.3%)	189 (77.8%)	
TOP ≥ 28 w, n (%)	37 (29.1%)	17 (14.7%)	54 (22.2%)	P <0.05

TOP: termination of pregnancy, GA: gestational age, w: week, y: years, n: number of cases

Analysis of the Cause Leading to Late Termination of Pregnancy

Table II presents the subgroups of anomalies leading to TOP and their frequency distribution. The most common organ system affected by congenital malformations in the study population was the CNS, accounting for 43.2% of cases, followed by chromosomal abnormalities and confirmed microdeletion syndromes 17.3%, heart/circulatory system 11.1%, musculoskeletal system 8.2%, genitourinary system 4.1%, non-immune hydrops fetalis 2.1%, amniotic fluid abnormalities 3.3%, and multi-organ malformations 10.7%. Additionally, the analysis indicated a noteworthy rise in the percentage of instances with cardiovascular system anomalies and chromosomal abnormalities in the 2015-2022 group compared to the 2007-2014 group (p<0.05, respectively). In contrast, the proportion of cases with CNS anomalies was significantly lower in the 2015-2022 group (p<0.05) (Table II).

Table II. Fetal indications for termination of pregnancy by period

Fetal indication for TOP Cases		Group 1 (2007-20014)	Group 2 (2015-2022)	Total	
		N (%), ≥24 w	N (%), ≥24 w	N (%), ≥24 w	P
Central Nervous System					
Neural Tube Defect	Anencephaly	6	0	6	
	Encephalocele	3	3	6	
	Meningocele/Meningomyelocele	16	5	21	
	Chiari type 2 malformation	15	4	19	
Lateral Ventricular	Hydrocephalus	12	7	19	
	Hydranencephaly	2	0	2	
	Intracranial Hemorrhagic Lesions	1	3	4	
Midline Defects	CCA	6	4	10	
	Holoprosencephaly	2	1	3	
	Syntelencephaly	1	1	2	
Posterior Fossa Anomalies	Dandy Walker Malformation	3	0	3	
	Vermis Hypoplasia	1	2	3	
	Cerebellar Hypoplasia	1	0	1	
Cortical Developmental Malformations	Lissencephaly	0	2	2	
	Schizencephaly	0	2	2	
	Porencephaly	2	0	2	
	CNS Total	71 (67.6%)	34 (29.3%)	105 (43.2%)	P: 0.0001
Cardio-vascular System	Hypoplastic Left Heart	5	4	9	
	Double Outlet Right Ventricle	0	3	3	
	Tetralogy of Fallot	1	4	5	
	Aorta-Pulmonary Artery Malformations	1	4	5	
	Tricuspid Atresia	1	3	4	
	Single Ventricle	0	1	1	
	CVS Total	8 (6.3%)	19 (16.4%)	27 (11.1%)	P: 0.022
Genito-urinary System Anomalies	Bilateral Polycystic Kidney	2	2	4	
	Bilateral Multicystic Kidney	2	2	4	
	PUV+Dysplastic Kidney	1	0	1	
	Exstrophy Vesicae	0	1	1	
	GUS Total	5 (3.9%)	5 (4.3%)	10 (4.1%)	P> 0.05
Musculo-skeletal System Anomalies	Fatal Skeletal Dysplasias	12	2	14	
	Diaphragmatic Hernia	0	3	3	
	Limb Reduction Defects	1	1	2	
	Arthrogryposis Multiplex	0	1	1	
	MSA Total	13 (10.2%)	7 (6%)	20 (8.2%)	P> 0.05
Non Immune Hydrops Fetalis		5 (3.9%)	0 (0.0%)	5 (2.1%)	P> 0.05
Multiple Congenital Anomalies		12 (9.4%)	14 (12.1%)	26 (10.7%)	P> 0.05
Genetic/Chromosomal Abnormalities	Trisomy 21	6	9	15	
	Trisomy 18	3	3	6	
	Sex Chromosome Abnormalities	0	3	3	
	Single Gene Diseases	1	7	8	
	Duplications/Deletions	0	6	6	
	Other	1	3	4	
	Total	11 (8.7%)	31 (26.7%)	42 (17.3%)	P: 0.0001
Placenta/Amnion Disorders		2 (1.6%)	6 (5.2%)	8 (3.3%)	P> 0.05
Total		**127 (100%)**	**116 (100%)**	**243 (100%)**	

'TOP: termination of pregnancy, CNS: central nervous system, CCA: corpus callosum agenesis, PUV: posterior urethral valve, C-VS: cardio-vascular system, GUS: genito-urinary system, MSA: Musculo-skeletal System Anomalies, w: week, n: number of cases' χ Statistical analysis was performed using Pearson's Chi-squared test f Statistical analysis was performed using Fisher exact test.

The proportion of the most common fetal disorders by -4year time interval

Over the past sixteen years, the most frequent reasons for late TOP involving fetuses have been CNS malformations, chromosomal abnormalities, and cardiovascular system anomalies, and the change over the years is shown in the graph (Figure 1).

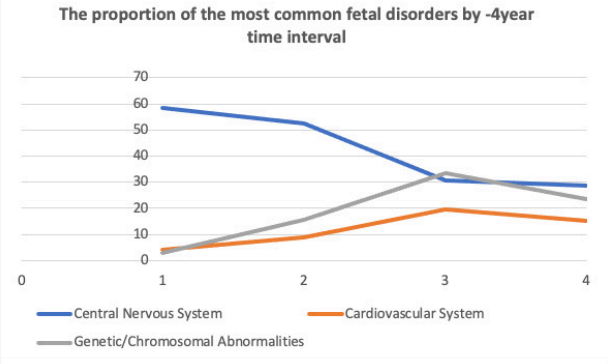

Figure 1. Shifts in the primary factors behind late pregnancy termination across four-year intervals in the past sixteen years

Late TOP indication change depending on the third trimester

The study population consisted of 243 cases of late TOP, with 77.8% of the cases occurring in the late second trimester and 22.2% in the third trimester. The most common cause of late TOP in the third-trimester group was CNS anomalies, followed by genetic chromosomal diseases and musculoskeletal diseases (Table III).

Table III. Fetal indication for third-trimester termination of pregnancies

	N (%)
Central Nervous System	32 (59.3%)
Cardiovascular System	2 (3.7%)
Genito-urinary System Anomalies	1 (1.9%)
Musculo-skeletal System Anomalies	6 (11.1%)
Non Immune Hydrops Fetalis	2 (3.7%)
Multiple Congenital Anomalies	3 (5.6%)
Genetic/Chromosomal Abnormalities	8 (14.8%)
Total	54 (100%)

TOP: termination of pregnancy

CNS anomalies were the major cause in both groups, accounting for 38.6% of cases in the late second-trimester group and 59.3% of cases in the third-trimester group. There was a statistically significant difference in the proportion of cases terminated due to CNS anomalies between the two groups ($p<0.05$). In the overall cohort, anomalies in other systems did not exhibit any statistically significant variations that resulted in second or third-trimester terminations.

DISCUSSION

Late pregnancy termination, a procedure performed after the 24th week of pregnancy, is a complex and controversial issue. This procedure is typically only recommended if a serious medical or health condition makes it necessary. With the improvement of medical ultrasound technology and the widespread use of prenatal screening, it has become feasible to identify various fetal anomalies, such as structural, chromosomal, and genetic abnormalities (2, 7). The Royal College of Obstetricians and Gynaecologists (RCOG) and the National Institutes for Clinical Excellence (NICE) Guidelines for Routine Antenatal Care recommend ultrasound screening for structural anomalies between, 18 and 21 weeks of gestation (13-16). However, some severe anomalies may go undiagnosed until the third trimester and late termination of pregnancy may be required.

In our study, CNS and cardiovascular anomalies are the most common causes of late termination in both groups, accounting for more than 50% of cases. Among these, CNS anomalies represent the leading cause, encompassing 43.2% of cases. These findings align with previous studies, which have also identified CNS malformations as a leading cause of TOP (17-19). The late recognition of findings owing to continued brain development and maturation contributes to the prominence of CNS anomalies as the leading cause of third-trimester terminations. Among CNS anomalies, neural tube defects (NTD) and hydrocephalus were the most common in our study. In the literature, it has been reported that between the 11th and 14th weeks, transvaginal ultrasonography detects NTDs with a rate of over 90% for anencephaly, approximately 80% for encephalocele, and lower detection rates for spina bifida (around 44%) (20). In comparison, a review of second-trimester ultrasound examination in a high-risk population reported 92 to 95 percent detection of spina bifida and 100 percent detection of anencephaly (21). In our study, we believe that the higher incidence of NTD indications in cases of late-TOP observed particularly before the year 2014, can be attributed to insufficient obstetric ultrasonography due to equipment and operator inexperience in this group of patients, most of whom were referred from external centers, and the patient's delayed presentation to a tertiary referral hospital. Hydrocephalus typically manifests in the late second or third trimester, which may explain its prevalence (22).

In our research, when comparing the periods from 2007 to 2014 and from 2015 to 2022, we observed an increase in the indications for late pregnancy termination, particularly in cases related to genetic and cardiovascular diseases. This emerging trend in cardiovascular system anomalies can be attributed to advancements in fetal heart scanning technology and the growing utilization of fetal echocardiography during routine anomaly scans (23). In addition, it is also reasonable to suggest that the increase in screening tests has increased the demand for genetic diagnostic test-

ing in high-risk populations and has made possible antenatal genetic diagnoses. With the increasing popularity of first-trimester screening tests (such as cell-free DNA testing and combined screening at 11-14 weeks), along with the increasing utilization of early anatomy scanning, and the advancements made in the field of genetic diagnosis, it is now possible to establish an early diagnosis for genetic disorders. This may explain the plateau that genetic and cardiovascular diseases have charted since 2018. It is important to note that the above findings are derived from our study and are specific to the analyzed periods. Nevertheless, our results highlight the impact of technological advancements and evolving screening methods in detecting and managing genetic and cardiovascular diseases during pregnancy.

When analyzing specific subgroups within the CNS anomalies over the years, it becomes apparent that the increased utilization of screening methods has resulted in the earlier termination of pregnancies affected by NTDs such as anencephaly, predominantly during the early second trimester (24). However, we hypothesized that the reason for the delayed termination of pregnancy due to early recognizable major NTDs in Türkiye, particularly during the period between 2007 and 2014, may be attributed to factors such as patient refusal of prenatal care or limited accessibility to screening programs.

Adding standard anatomical scanning to NT measurement in the first-trimester screening test provided a detection rate of 43.1% (95% confidence interval, 40.6%-45.5%) in detecting at least 1 fetal structural abnormality (25). In addition, previous studies have found that detection rates of fetal abnormalities in individual institutions have increased in recent years, with constantly improving techniques and increasing personal skills in ultrasound scanning (15, 23). Expanding screening and genetic diagnostic testing opportunities in healthcare institutions, encouraging patients to have screening tests and anatomical scanning of the fetus at earlier weeks, better-trained operators in first and second-trimester ultrasound scans, and developments in ultrasound technology are critical in reducing the late termination group.

In our investigation of the primary causes of third-trimester termination over the past eight years were CNS anomalies and genetic anomalies. Specifically, among the CNS anomalies, hydrocephalus and intracranial hemorrhage emerged as the predominant causes. The progressive development and maturation of the fetal brain contribute to the late recognition of these abnormalities and thus necessitate termination in the third trimester. Although it is impossible to proactively reduce the likelihood of anomalies diagnosed in the third trimester, including third-trimester ultrasound screening is crucial to provide comprehensive awareness. By identifying previously undiagnosed fetal abnormalities, this approach enables healthcare providers to address conditions that may have been missed in previous screenings or that may occur later in pregnancy. These anomalies can be categorized into three groups: Firstly, some abnormalities might have been missed in previous scans routinely performed at 11-13 and 18-24 weeks of gestation. Secondly, phenotypic expressions, become apparent only after the 20th week of gestation. For instance, conditions like achondroplasia, characterized by short limbs, intestinal atresia indicated by dilated bowel, or craniosynostosis leading to an abnormal head shape, may exhibit phenotypic manifestations beyond the earlier scans. Finally, certain abnormalities may manifest themselves only in the third trimester. These abnormalities may not be detected on previous scans because of their specific nature or time of development. Examples of such abnormalities include ovarian cysts resulting from maternal estrogenic stimulation, fetal cerebral hemorrhage, or ventriculomegaly following maternal infection (26). High awareness of USG operators in third-trimester obstetric US examinations allows diagnosis and termination in the antenatal period.

CONCLUSION

In conclusion, this analysis focuses on the differences between late second and third-trimester terminations and provides insight into the causes of late termination of pregnancy. Especially in the third trimester, CNS anomalies are an important cause of late TOP. A limited early anatomical scan for early detection and management of fetal anomalies and a third-trimester neurosonogram for late findings would be particularly helpful. More research is needed to explore the complex issues surrounding late TOP and identify strategies to reduce its incidence.

Ethics Committee Approval

This research complies with all the relevant national regulations, institutional policies and is in accordance with the tenets of the Helsinki Declaration, and has been approved by the Akdeniz Medical Faculty Ethical Committee, Akdeniz University (approval number: KAEK-544, Date: 19.07.2023).

Informed Consent

All the participants' rights were protected and written informed consents were obtained before the procedures according to the Helsinki Declaration.

Author Contributions

Design; Supervision; Resources; Analysis and/ or Interpretation; Literature Search; Writing Manuscript – E. K, G. A. B.; Materials; Data Collection and/or Processing – H. K., T. M.; Critical Review – C. Y. S., I. I. M.

Conflict of Interest:

The authors have no conflict of interest to declare.

Financial Disclosure:

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REFERENCES

1. Peller AJ, Westgate MN, Holmes LB. Trends in congenital malformations, 1974-1999: effect of prenatal diagnosis and elective termination. Obstetrics and Gynecology 2004; 104(5 Pt 1):957-64.

2. Stoll C, Alembik Y, Dott B, Roth MP. Impact of prenatal diagnosis on livebirth prevalence of children with congenital anomalies. Annales de genetique 2002; 45(3):115-21.

3. Carlson LM, Vora NL. Prenatal Diagnosis: Screening and Diagnostic Tools. Obstetrics and gynecology clinics of North America 2017; 44(2):245-56.

4. Schechtman KB, Gray DL, Baty JD, Rothman SM. Decision-making for termination of pregnancies with fetal anomalies: analysis of 53,000 pregnancies. Obstetrics and Gynecology 2002; 99(2):216-22.

5. Garne E, Khoshnood B, Loane M, Boyd P, Dolk H. Termination of pregnancy for fetal anomaly after 23 weeks of gestation: a European register-based study. BJOG : an international journal of obstetrics and gynaecology 2010; 117(6):660-6.

6. Leung TN, Ching Chau MM, Chang JJ, Leung TY, Fung TY, Lau TK. Attitudes towards the termination of pregnancy among Hong Kong Chinese women attending prenatal diagnosis counselling clinic. Prenatal diagnosis 2004; 24(7):546-51.

7. Kandel I, Merrick J. Late termination of pregnancy. Professional dilemmas. TheScientificWorldJournal 2003; 3:903-12.

8. Wool C. Systematic review of the literature: parental outcomes after diagnosis of fetal anomaly. Advances in neonatal care : official journal of the National Association of Neonatal Nurses 2011; 11(3):182-92.

9. Lalor J, Begley CM, Galavan E. Recasting Hope: a process of adaptation following fetal anomaly diagnosis. Social science & medicine (1982) 2009; 68(3):462-72.

10. Gissler M, Fronteira I, Jahn A, Karro H, Moreau C, Oliveira da Silva M, Olsen J, Savona-Ventura C, Temmerman M, Hemminki E; REPROSTAT group. Terminations of pregnancy in the European Union. BJOG : an international journal of obstetrics and gynaecology 2012; 119(3):324-32.

11. Turkey. Law on Population Planning No. 2827. 1983, 24 May 1983, [accessed 11 February 2022]. available at: https://www. refworld.org/docid/4c4476752.html

12. World Health Organization (2020) Classification of diseases (ICD). World Health Organization, Geneva

13. Salomon LJ, Alfirevic Z, Berghella V, Bilardo CM, Chalouhi GE, Da Silva Costa F, Hernandez-Andrade E, Malinger G, Munoz H, Paladini D, Prefumo F, Sotiriadis A, Toi A, Lee W. ISUOG Practice Guidelines (updated): routine mid-trimester fetal ultrasound scan performance. Ultrasound in obstetrics & gynecology : the official journal of the International Society of Ultrasound in Obstetrics and Gynecology 2022; 59(6):840-56.

14. ACOG. Practice Bulletin No. 175: Ultrasound in Pregnancy. Obstetrics and gynecology. 2016;128(6):e241-e56.

15. Excellence. NIfHaC.Abortion care (NICE guideline NG140). Sept 2019.

16. National Collaborating Centre for Ws, Children's H. National Institute for Health and Clinical Excellence: Guidance. Antenatal Care: Routine Care for the Healthy Pregnant Woman. London: RCOG Press Copyright © 2008, National Collaborating Centre for Women's and Children's Health.; 2008.

17. Dommergues M, Benachi A, Benifla JL, des Noëttes R, Dumez Y. The reasons for termination of pregnancy in the third trimester. British journal of obstetrics and gynaecology 1999; 106(4):297-303.

18. Bosma JM, van der Wal G, Hosman-Benjaminse SL. Late termination of pregnancy in North Holland. British journal of obstetrics and gynaecology 1997; 104(4):478-87.

19. Dickinson JE. Late pregnancy termination within a legislated medical environment. The Australian & New Zealand journal of obstetrics & gynaecology 2004; 44(4):337-41.

20. Taipale P, Ammälä M, Salonen R, Hiilesmaa V. Learning curve in ultrasonographic screening for selected fetal structural anomalies in early pregnancy. Obstetrics and gynecology 2003; 101(2):273-8.

21. Cameron M, Moran P. Prenatal screening and diagnosis of neural tube defects. Prenatal diagnosis 2009; 29(4):402-11.

22. Yinon Y, Katorza E, Nassie DI, Ben-Meir E, Gindes L, Hoffmann C, Lipitz S, Achiron R, Weisz B. Late fetal central nervous system anomalies diagnosis following a normal second trimester anatomy scan. Prenatal diagnosis 2013; 33(10):929-34.

23. Allan LD. Cardiac anatomy screening: what is the best time for screening in pregnancy? Current opinion in obstetrics & gynecology 2003; 15(2):143-6.

24. Syngelaki A, Hammami A, Bower S, Zidere V, Akolekar R, Nicolaides KH. Diagnosis of fetal non-chromosomal abnormalities on routine ultrasound examination at 11-13 weeks' gestation. Ultrasound in obstetrics & gynecology : the official journal of the International Society of Ultrasound in Obstetrics and Gynecology 2019; 54(4):468-76.

25. Liao Y, Wen H, Ouyang S, Yuan Y, Bi J, Guan Y, Fu Q, Yang X, Guo W, Huang Y, Zeng Q, Qin Y, Xiang H, Li S. Routine first-trimester ultrasound screening using a standardized anatomical protocol. American journal of obstetrics and gynecology 2021; 224(4):396.e1-.e15.

26. Ficara A, Syngelaki A, Hammami A, Akolekar R, Nicolaides KH. Value of routine ultrasound examination at 35-37 weeks' gestation in diagnosis of fetal abnormalities. Ultrasound in obstetrics & gynecology : the official journal of the International Society of Ultrasound in Obstetrics and Gynecology 2020; 55(1):75-80.