

Fetomaternal Outcome in Pregnant Patients with Mitral Stenosis: A Risk Stratification Study Based on Wilkins Score

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Abstract

Objective: To evaluate fetomaternal outcomes in pregnant women diagnosed with mitral stenosis, categorizing them based on Wilkins Score. The findings highlight how disease severity correlates with pregnancy complications and neonatal health.

Material and Methods: This descriptive case series was conducted from January 2020 to December 2021 at Services Hospital, Lahore. We included 161 pregnant women with MS, categorized into Wilkins score groups to evaluate correlations with delivery mode, preterm birth, Apgar score, birth weight, and intrauterine death. Exclusion criteria included other cardiovascular or systemic conditions. Data were analyzed using IBM-SPSS v.22 for frequencies and associations.

Results: The mean maternal age was 29.1 ± 2.9 years, and the mean gestational age at delivery was 26.2 ± 3.3 weeks. Cesarean deliveries occurred in 30.4% of cases, with a preterm birth rate of 18.6%. Low Apgar scores (<6) were observed in 13.7% of neonates, and 25.5% had low birth weights (<2.5 kg). Severe MS (Wilkins score >11) was linked to higher rates of adverse outcomes, including preterm birth and low Apgar scores.

Conclusion: Mitral stenosis in pregnancy is associated with elevated risks of preterm birth, low birth weight, and neonatal complications, underscoring the need for tailored management strategies. Pre-pregnancy counselling, early risk stratification using the Wilkins score, and proactive antenatal care are crucial for improving maternal and fetal outcomes.

Keywords: Mitral Stenosis, Wilkins Score, Fetomaternal Outcome

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Introduction

Mitral stenosis refers to the constriction of the mitral valve opening, frequently resulting

from rheumatic valvulitis, which leads to the fusion of the valve commissures and the thickening of the valve leaflets. This leads to reduced filling of the left ventricle, increased left atrial pressure, resulting in heart failure, atrial fibrillation and release of thrombotic emboli in circulation. With progression of disease, pulmonary hypertension and right heart failure also occur.¹

The Wilkins score is a crucial echocardiographic tool for assessing mitral stenosis, evaluating four components: leaflet mobility, thickness, calcification, and sub valvular thickening. Scores range from 1 to 4 for each component, with a total

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score of ≤ 8 (category 1) indicating a favorable outcome for percutaneous balloon mitral valvuloplasty (PBMV). Scores between 9 and 11 (category 2) represent a “grey zone,” where treatment success is uncertain, while scores >11 (category 3) suggest poor outcomes². The Wilkins Score, initially developed to assess the suitability for balloon valvuloplasty, has gained relevance in stratifying pregnancy-associated risks. Understanding how varying degrees of MS affect pregnancy outcomes can help tailor management strategies for better maternal and fetal health.

Mitral stenosis (MS) poses significant risks to pregnant women and their fetuses due to increased hemodynamic stress. Understanding the fetomaternal outcomes associated with MS in pregnancy is essential for optimal clinical management.

Pregnant women with MS frequently experience adverse maternal outcomes such as heart failure, arrhythmias, and thromboembolic events, especially in cases of severe stenosis (valve area $<1 \text{ cm}^2$) or higher New York Heart Association (NYHA) class. - The total incidence of severe unfavorable maternal and fetal outcomes in pregnant women with mitral stenosis was 44.8%. Research suggests that the incidence of heart failure in these women can reach 69%, with nearly half developing severe pulmonary hypertension, thereby increasing the risk of adverse maternal events.³ Maternal mortality is also higher in this cohort, particularly among those with uncorrected or severe MS who are not adequately monitored or treated during pregnancy.

Fetal outcomes in cases of pregnancy complicated by MS are equally concerning. There are increased rates of preterm birth, low birth weight, and intrauterine growth restriction, with approximately 54.5% of neonates born to mothers with mild or severe MS being preterm. The risk of intrauterine death is significantly elevated in severe cases, potentially due to compromised utero-placental blood flow resulting from maternal cardiovascular dysfunction. Valvular heart disease, particularly mitral stenosis, is linked to unfavorable pregnancy outcomes.^{4,5}

Recent advancements in management strategies emphasize comprehensive pre-pregnancy counseling, regular antenatal monitoring, and timely interventions to improve outcomes in pregnancies affected by MS.

Material and Methods

This was a descriptive case series conducted From January 2020 to December 2021 in the Department of Obstetrics and Gynaecology at Services Hospital ,Lahore. Informed consent was taken from One hundred and sixty one pregnant women with mitral stenosis and were included in the study with singleton pregnancies, gestational age greater than 12 weeks, aged 20 to 40years . We categorized the mitral stenosis patients according to Wilkins score <8 (category 1), 9-11(category 2) and 12-16(category 3).Anemia, congenital heart conditions, cardiomyopathy, hypertension, asthma, diabetes mellitus, renal disease, or thyroid disease were excluded from participation in the study. All these women were followed from the time of booking till delivery and relevant data was noted on a predesigned proforma containing , Age, parity, weight, NYHA class, mode of delivery, time of delivery , fetal (APGAR score, Birth weight, stillbirth) and maternal outcome(preterm birth). IBM-SPSS.V.22 was utilized to analyze the data, calculating frequency and percentage for qualitative variables and mean \pm SD for quantitative variables. Ethical approval reference no. CPSP/REU/OBG-2017-068-8189.

Results

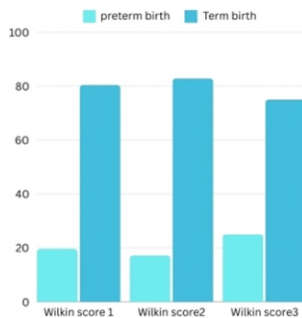
The study analyzed the prevalence of preterm birth and gestational age at delivery in pregnant females with mitral stenosis aged 20-40 years . It also recorded the effect of mitral stenosis on Stillbirth , APGAR score and birth weight of neonate. The mean age was 29.111 ± 2.90 years, mean gestational age at birth was 26.248 ± 3.28 weeks, mean parity was 1.919 ± 1.31 , and mean weight was 66.6522 ± 6.08 kg. The Wilkins Score of each patient was recorded.

In the age group 20-30 years 31.4% had cesarean section which comparable to the age group 30-40 years(27.5%). In early preterm period 29.4% had CS while 36% had CS in late preterm period. In wilkins score 1 CS was done in 25% and in score 2 and 3 it was 33.3%.

Preterm delivery was more common in patients aged 30-40years (27.5%) than patients in 20-30years(15.7%). Frequency of early preterm birth was 30/161 and there was no late preterm delivery(p-value 0.786).

Table 1: Outcome of MS patients

Variables		Frequency(%)
Cesarean delivery		49(30.4%)
Vaginal delivery		112(69.6%)
Preterm birth		30(18.6%)
Term birth		131(81.4%)
APGAR <6		22(13.7%)
APGAR>6		139(86.3%)
Birth weight <2.5kg		41(25.5%)
Birth weight >2.5kg		120(74.5%)
Intrauterine	yes	11(6.8%)
Death	no	150(93.2%)

**Figure-1:** Association of Wilkins score with Preterm Birth.

In early preterm birth 12.5% and in late preterm birth 20% had APGAR score <6.

In conclusion, the study provides valuable insights into the prevalence and stratification of preterm births in a population aged 20-40 years. By understanding these factors, healthcare providers can better support their patients and improve their outcomes.

Table 2: Association of Wilkins score with different variables.

Wilkin score	Frequency	Mode of delivery n(%)		Preterm birth		APGAR score		Birth weight kg		Still birth	
		CS	Vag	yes	no	<6	>6	<2.5	>2.5	yes	no
1	56	14	42	11	45	7	49	20	36	4	52
	-34.80%	-25	-75	-20	-80	-13	-88	-38	(64.3	-7	-93
2	93	31	62	16	77	11	82	21	72	6	87
	-57.80%	-33	-67	-17	-83	-12	-88	-23	-77	-7	-94
3	12	4	8	3	9	4	8	0	12	1	11
	-7.50%	-33	(66.7	-25	-75	-14	-67	0	-100	-8	-92

Discussion

About 94.5% of mitral valve defects in developing nations like Pakistan are caused by rheumatic heart disease, with mitral stenosis accounting for the highest percentage at about 55%.⁶ In another study conducted in PIMS Islamabad, the frequency of mitral stenosis in pregnancy was 53.97% among all valvular heart diseases.⁷ Our study showed that 34.8% of patients were in category 1 according to wilkins score, 57.7% were in category 2 and 7.5% in category 3. In comparison the degree of MS was mild in 48.38% , moderate in 32.24% and severe in 19.35% of women in a study conducted in a teaching hospital in Kathmandu, Nepal.⁸ We studied the adverse maternal and fetal outcomes in pregnant patients with mitral stenosis. We observed that frequency of preterm birth in our patients with mitral stenosis was 18.6%. The distribution of preterm birth according to Wilkins score 1,2 and 3 was 12.5%, 20% and 13.7% respectively. According to a similar study by Lubna et al the frequency of preterm birth was 20%. In our study the frequency of APGAR score<6 was 13.7% while in the above study it was 32.5%.⁶ In our study the frequency of low birth weight was 25.5% and Intrauterine death was 6.8%. High rates of preterm birth (9.35%-42.97%), LBW (12.98%-39.70%), IUGR (6.76%-22.40%), and perinatal death (0.00%-9.41%) were observed in a meta-analysis involving 3928 pregnancies.⁹ Low birth weight, preterm delivery, and stillbirth rates among MS patients were 26.5%, 16%, and 6.1%, respectively, according to a study done in Adisa Baba, Ethiopia. These results are more comparable to our own.³ It was noted in various studies that percutaneous commissurotomy of mitral valve in second trimester where indicated results in lower incidence of low birth weight and still birth.¹⁰ So effort should be made to assess and categorize the patients eligible for balloon valvuloplasty, PMVR and surgical mitral valve repair or replacement in order to improve outcome of pregnant females.

Conclusion

Mitral stenosis in pregnancy presents significant hemodynamic challenges and risks for both mother and fetus. Effective clinical management, guided by tools like the Wilkins score, is crucial for optimizing outcomes.

Conflict of Interest None

Funding Source None

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Authors Contribution

SM, AS: Conceptualization of Project

SM, SA: Data Collection

SM, KI: Literature Review

AS, SM: Statistical Analysis

KI, NM: Drafting, Revision

SM, AS: Writing of Manuscript