

**MATERNAL-FETAL REPERCUSSIONS OF MITRAL STENOSIS DURING
PREGNANCY: AN INTEGRATIVE REVIEW****REPERCUSSÕES MATERNO-FETAIS DA ESTENOSE MITRAL NA GRAVIDEZ:
UMA REVISÃO INTEGRATIVA****REPERCUSIONES MATERNO FETAL DE LA ESTENOSIS MITRAL
DURANTE EL EMBARAZO: UNA REVISIÓN INTEGRATIVA**

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ABSTRACT

Objective: perform an integrative review about maternal-fetal repercussions of mitral stenosis during pregnancy. Methods: study on Literature Databases in Latin America and the Caribbean in Health Sciences, portal of Coordination of Improvement of Higher Education and the National Library of Medicine in 2000 to 2013 publications. Data collection was from January to February 2014. Obtained a sample of nine publications. Results: the mitral stenosis presents greater maternal-fetal impact compared to other valvular heart diseases. The maternal effects: pulmonary edema, pulmonary hypertension, progression of functional class, heart failure, increase in prescription drugs, tachycardia and cardiomegaly. The fetal repercussions: retardation of fetal growth, increased rate of prematurity and low birth weight. Conclusion: it is recommended that an integrated multidisciplinary team work, drug therapy, dietary control and restriction in daily activities.

Keywords: Cardiovascular Diseases; Mitral Valve Stenosis; Pregnancy Complications, Cardiovascular.

RESUMO

Objetivo: realizar uma revisão integrativa sobre as repercussões materno-fetais da estenose mitral na gravidez. Métodos: estudo realizado nas bases de dados Literatura Latino-Americana e do Caribe em Ciências da Saúde, portal da Coordenação de Aperfeiçoamento de Pessoal de Ensino Superior e a Biblioteca Nacional de Medicina nas publicações de 2000 a 2013. A coleta de dados foi janeiro a fevereiro de 2014. Obteve-se uma amostra de nove publicações. Resultados: a estenose mitral apresenta maior repercussão materno-fetal em comparação a outras valvopatias. Repercussões maternas: edema pulmonar, hipertensão pulmonar, progressão de classe funcional, insuficiência cardíaca, aumento de medicamentos

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prescritos, taquicardia e a cardiomegalia. Repercussões fetais: retardo do crescimento fetal, aumento da taxa de prematuridade e baixo peso ao nascer. Conclusão: recomenda-se um trabalho integrado da equipe multiprofissional, terapêutica medicamentosa, controle dietético e restrição nas atividades cotidianas.

Descritores: Doenças Cardiovasculares; Estenose da Valva Mitral; Complicações Cardiovasculares na Gravidez.

RESUMEN

Objetivo: realizar una revisión integrativa sobre repercusiones materno fetal de la estenosis mitral durante el embarazo. Métodos: estudio de bases de datos de la literatura en América Latina y el Caribe en Ciencias de la Salud, portal de Coordinación de Mejoramiento de la Educación Superior y la Biblioteca Nacional de Medicina entre 2000 al 2013. Los datos fueron recolectados de enero a febrero de 2014. Se obtuvo una muestra de nueve publicaciones. Resultados: la estenosis mitral presenta mayor impacto materno fetal en comparación con otras enfermedades valvulares del corazón. Efectos maternos: edema pulmonar, hipertensión pulmonar, progresión de clase funcional, insuficiencia cardíaca, aumento de las medicinas recetadas, taquicardia y cardiomegalia. Consecuencias fetales: retraso de crecimiento fetal, aumento de la frecuencia de prematuridad y bajo peso al nacer. Conclusión: se recomienda que se trabaje en un equipo multidisciplinario integrado, terapia medicamentosa, control dietético y la restricción en las actividades cotidianas.

Palabras clave: Enfermedades Cardiovasculares; Estenosis de la Válvula Mitral; Complicaciones Cardiovasculares del Embarazo.

INTRODUCTION

Mitral stenosis is determined by the resistance of atrial blood flow to the left ventricle, due to the thickening and immobility of the leaflets. It stands out for being the most frequent maternal heart disease, accounting for 75-80% of cases.¹ The average incidence of heart disease in pregnancy is 4.2%, eight times higher when compared to international averages, and is considered the leading cause of indirect maternal death during pregnancy and puerperal cycle.²

The first clinical manifestation of mitral stenosis can occur during pregnancy or in immediate postpartum period.³ The first cardiologic evaluation should be performed before pregnancy or during the

first trimester, when the hemodynamic changes are usually subtle. Patients considered low to medium risk should be evaluated again during the final of second trimester.⁴ Patients at high risk require more frequent hemodynamic evaluations in peripartum, because until breastfeeding, it can increase cardiac work. Those with severe mitral stenosis should be followed for at least six months after childbirth to monitor the clinical progress and assess the hemodynamic state.⁵ For those with mitral stenosis with signs of obstetrical or cardiac complications, should be recommended hospitalization.⁶

Differentiation of signs and symptoms between normal pregnant women and women with heart diseases

becomes often difficult. Dyspnea, peripheral edema and fatigue, may not be valued this period because they are common in normal pregnant women in the third trimester. In pregnant women with mitral stenosis complaints of palpitation are common, nocturnal dry cough, orthopnea, paroxysmal nocturnal dyspnea, hemoptysis, precordial pain on exertion, syncope.³

Physical examination allows a reliable evaluation with high specificity for the diagnosis of valvopathies and previous knowledge of history data can guide the health professional during the physical examination (presence of blow, *ictus cordis* shifted to the left, hyperphonesis and the first heart sound). In addition to the clinical findings, image exams such as echocardiography, become crucial for making possible the difference of pathological features (valve image). Cardiac catheterization becomes necessary when there is discrepancy between the clinical findings and may provide additional information for making decisions.⁶ Cardiac surgery is indicated in cases of refractory pulmonary congestion to clinical treatment or inability of percutaneous treatment using balloon catheter.³

Mitral stenosis in addition to presenting high incidence constitutes one of the worst prognoses of valve disease in

pregnancy, being considered high risk. The knowledge of the repercussions of mitral stenosis in pregnancy is crucial for early identification of maternal and fetal complications, prognosis estimation and for making conduits providing subsidies for the planning of a more qualified assistance. This study aimed to carry out an integrative review of the maternal-fetal repercussions of mitral stenosis during pregnancy.

METHOD

Elaboration of the integrative review process consisted of six steps: selection of hypotheses or questions to the review; selection of the research that will compose the review sample; definition of the characteristics of primary researches in the sample; analysis of the findings of the articles included in the review; interpretation of results and review report⁷, providing a critical examination of the findings.

Formulation of the problem is the following guiding question: What knowledge has been produced on the effects of mitral stenosis in pregnancy?

This study was conducted through databases: Latin American and Caribbean literature in Health Sciences, Portal of Improvement and Coordination of Higher education Personnel and the National Library of Medicine. The following

descriptors were used: cardiac valves; mitral valve stenosis; pregnancy, also in the languages English and Spanish with appropriate crossings. Publications outlined by some methodological criteria were included, encompassing scientific articles, dissertations and theses published from January 2000 to December 2013. The data collection period was from January to February 2014.

In the selection of publications, a careful reading of titles and then of the summaries to confirm that answered the guiding research question and then performed the reading of the article in its entirety to confirm the compliance with the established inclusion and exclusion criteria.

Upon crossing the descriptors it was initially identified 10,578 publications. In reading the titles and abstracts 8,798 publications were selected, with 45 publications having been selected after full reading. Of those, 25 (twenty five) were in the portal database of Higher Education Personnel Improvement Coordination, twelve (12) in Latin American and Caribbean Health Sciences and 07 (seven) in the National Library of Medicine. Excluding duplicate studies and published in duplicate languages, the sample totaled 09 (nine) publications.

This research was conducted according to the Copyright Law, which

Law is under No. 9610 of February 1998.⁸ Therefore, the study was properly conducted in order not to plagiarize any work, always appropriately performing the citation of sources and authoring and dispensing appropriate treatment to the data obtained.

RESULTS

Selected publications were distributed to the following criteria: the year of publication, the source, the type of study, the objectives of the study, the sample number, number of pregnancies, the most frequent maternal and fetal complications, maternal-fetal deaths and the conclusions / recommendations of the authors.

Chart 1 shows the distribution of publications according to the first author, year of publication, source, type and objectives of the study.

Chart 1: Distribution of publications according to the author, year of publication, source, type of study and study objectives.

First Author / Year	Origin	Kind of study	Goals
1.Barbosa PJB, 2000 ⁹	Brazil-BA	Transversal, analytical, retrospective	Identify the clinical and echocardiographic characteristics related to the occurrence of complications during

			pregnancy and the postpartum period in women with mitral stenosis			after pregnancy.	
2.Dessai, 2000 ¹⁰	South Africa-Durban	Transversal, analytical, prospective	To evaluate the evolution of mitral stenosis in pregnancy, prospectively, with emphasis on women with persistent symptoms.	5.Sobelga, 2004 ¹³	Poland-Krakow	Transversal, descriptive, prospective	Evaluate the outcome of pregnancy and childbirth in patients with acquired heart disease and after valve replacement, which were under observation at the Department of Cardiovascular Disease, Cardiology Institute, Krakow.
3.Hameed, 2001 ¹¹	EUA- Los Angeles	Case control, longitudinal, analytical, retrospective	To evaluate the association between valvular heart disease, and maternal and fetal repercussions through a comparison with a control group.	6.Silva Shaah, 2005 ¹⁴	England-London	Case study	Present a case study on the physiological impact of volume overload and diuresis in pulmonary pressure on peripartum in a patient with moderate mitral stenosis.
4.Silverdis, 2003 ¹²	Canada-Toronto	Cohort, Longitudinal, analytical, prospective	Define the predictors of maternal cardiac complications in pregnant women with rheumatic mitral stenosis. Evaluate the echocardiographic changes and the severity of the injury during and	7.Fernandes, 2009 ¹⁵	Brazil- São Paulo	Transversal, descriptive, retrospective	Assess and describe the main maternal repercussions (clinical and obstetric) and perinatal related to the predominant type of mitral lesion

			(stenosis or insufficiency) during pregnancy. Evaluate the influence of echocardiographic variables on maternal and perinatal complications
8.Menachem, 2011 ¹⁶	EUA- New York	Case Study	Discuss the management of peripartum of a patient with severe mitral stenosis according to clinical repercussions.
9.Grant, 2013 ¹⁷	EUA- Texas	Case Study	Present a case of childbirth complicated by mitral stenosis

It is observed the highest number of publications in the year 2000 with 2(two) publications, in other years there was only 1 (one) publication. As regards the type of study, it identified 4 (four) publications on transversal-methodology (2 analytical studies and 2 descriptive), 2 (two) publications of longitudinal nature (1 prospective cohort study and 1 case study retrospective control) and 3 (three) publications in the form of case study. As to the objectives of analyzed publications, 6 (six) publications have focused

specifically study the mitral stenosis in pregnancy. A publication aimed to study the mitral valve disease and their maternal and fetal repercussions and 2 (two) publications investigated the valvular lesions in pregnancy, and made specific approaches to mitral stenosis.

Regarding the distribution of the studies according to the number of women, number of pregnancies and maternal and fetal complications, maternal repercussions that stood out were pulmonary edema (55.5%), the progression of functional class (33.3%), severe pulmonary hypertension (22.2%), congestive heart failure (22.2%), increase about 11% in the dose of heart medication prescribed, tachycardia and cardiomegaly. The Intrauterine restricted growth was the most frequent fetal distress, corresponding to 33.3%, followed by prematurity (11.1%) and low birth weight (11.1%). In a publication the author reported that there were no fetal complications and on three publications fetal repercussions were not described. Regarding the severity and outcome of maternal-fetal repercussions, two publications presented percentage of maternal death that ranged from 1.28% to 2.3% and four publications described the stillbirth percentage of 2.5% to 7.2% .

Mitral stenosis presents a greater maternal and fetal distress compared to other valve diseases. Severe or moderate

mitral stenosis and a history of cardiac events before pregnancy are independent predictors of maternal complications during pregnancy. It is emphasized that the area of the mitral valve, functional class, hypertrophy and left ventricular dysfunction are worse prognostic factors. The authors recommend the importance of an integrated work of the multidisciplinary team (Chart 2).

Chart 2: Distribution of publications, according to the conclusions and recommendations of the studies.

Publication - Number	Conclusions / Recommendations
Publication 1	The area of the mitral valve and functional classification in pregnant women with mitral stenosis are prognostic factors strongly associated with maternal complications, but can not be associated with fetal / neonatal events.
Publication 2	The authors warn of the secondary damage to late diagnosis and lack of evaluation specifically in cases where pregnancy occurs in association with mitral stenosis, affecting the healthy course of pregnancy.
Publication 3	The study points to the need for maternal and fetal monitoring more appropriate and frequent.
Publication 4	The study shows that severe or moderate mitral stenosis and history of cardiac events before pregnancy are independent predictors

	of maternal complications during pregnancy.
Publication 5	The presence of severe stenotic lesion in addition to the diagnosis of hypertrophy and deficit in left ventricular function, are high risk factors for the mother's life during pregnancy and after childbirth.
Publication 6	The study recommends that the management must be done conservatively for asymptomatic patients in order to minimize the volume overload and extend the diastolic period.
Publication 7	In comparison to mitral insufficiency, mitral stenosis presented higher incidence of maternal, obstetric and neonatal complications. In the assessment of the echocardiographic variables only the area of the mitral valve correlated the worst prognosis in mitral stenosis group.
Publication 8	The author recommends that the management of pregnant women with mitral stenosis should be done on a multidisciplinary look.
Publication 9	The author highlights the positive result that was obtained facing the pregnant woman's encouragement to carry on the pregnancy, process that was successful.

DISCUSSION

Among the valvular heart disease during pregnancy, mitral stenosis stands out for being the most common.^{10,18} Despite the scientific and technological

development, the risk of maternal and fetal complications still remains high.¹⁹⁻²⁰ This can be explained by the limited adaptation to physiological cardiovascular changes that occur during pregnancy, particularly increased plasma volume and heart rate. In addition, the hypercoagulable state increases the risk of thromboembolism in patients with mitral lesion, atrial fibrillation and prosthetic heart valves. The reduction in peripheral vascular resistance from the first quarter influences the evolution of obstructive valvular lesions and in patients with arterial systemic hypertension.⁶

The first clinical manifestation of mitral stenosis can often occur during pregnancy or in immediately puerperium. The usual maternal complications are pulmonary congestion and paroxysmal supraventricular arrhythmia, and less frequently thromboembolism.³ Obstruction to atrial blood flow generates a pressure gradient between the atrium and the left ventricle, and the elevation of left atrial pressure is transmitted retrograde way to the pulmonary vascular lay, causing local congestion, interstitial edema, pulmonary hypertension and progressive development of symptoms.¹

It was observed that among the 9 (nine) selected publications in this research, 5 (five) publications presented pulmonary edema as maternal

complications of higher incidence. Studies identify pulmonary edema and congestive heart failure as the most common maternal complications.^{9,20}

The frequency of fetal / neonatal events is closely related to the area of the mitral valve and functional classification.²¹ The fetal morbidity has been estimated at approximately 33% in pregnant women with severe mitral stenosis 28% in patients with moderate mitral stenosis and 14% in patients with mild mitral stenosis, being the main cause prematurity regardless of the severity of the injury.¹² A study highlights the high rate of intrauterine growth restricted in their sample.¹¹ In a prospective study of 74 patients in Canada observed more representative cases of prematurity, without any invasive intervention for mitral stenosis correction.²¹ In Brazil with a sample of 41 pregnant women was identified that low birth weight was the most frequent neonatal complications. The hemodynamic impairment caused by reduced blood flow imposed and arrhythmias are likely explanations for the high incidence of fetal growth restriction observed in studies.⁹ In addition, drugs such as diuretics, beta-blockers and digitalis, have been associated with deficiency of uterine blood flow or with the increasing incidence of intrauterine growth restriction or prematurity.¹¹

The appearance of the symptoms is associated with increased mortality.³ Mitral stenosis associated with atrial fibrillation is a clinical condition with high risk of systemic thromboembolism,²² especially when associated with heart failure often have poor prognosis in pregnancies with increased risk of morbidity and mortality and the emergence of more serious complications.²³

It was observed in this review that although morbidity is high, maternal-fetal mortality had very limited frequency.^{12,24} Early diagnosis and careful monitoring, enables greater restriction of the number of deaths, especially in cases where the mother has functional class I and II which are more prevalent with improved prognosis when there are appropriate and effective treatment.¹¹ The pregnancy risks are higher in patients in functional class III, presenting right ventricular overload, atrial fibrillation and reduced mitral valve area.²⁵

CONCLUSION

Pregnant women with mitral stenosis have several maternal-fetal repercussions related to hemodynamic instability. The maternal repercussions identified in descending order were the pulmonary edema, progression of functional class, pulmonary artery hypertension, congestive heart failure,

increased heart medications prescribed dose, tachycardia, cardiomegaly. Fetal repercussions in descending order were the fetal growth retardation, increased rate of prematurity and low birth weight.

Despite the high morbidity, there was a maternal-fetal mortality limited, the percentage of maternal death ranged from 1.28 to 2.3% and stillbirth percentage of 2.5% to 7.2%. Aiming to reduce the clinical effects and symptom relief, it advocates especially a drug treatment with beta-blockers and diuretics, dietary control and limitation in daily activities.

Knowledge and identification of maternal and fetal outcome in pregnant women with mitral stenosis become crucial, requiring the integrated monitoring by a multidisciplinary team to plan a qualified assistance. As limitations of the study, it emphasizes the scarcity of publications focusing on systematic comparison between the populations and controlled and randomized studies with methodologies well-designed to evaluate the repercussions of stenosis in pregnancy and health interventions.

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