

# Comorbidity of Mitral Valve Stenosis with Influenza in Pregnancy, A Case Report

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## Abstract

In this case, a 44-year-old pregnant woman at a gestational age of 28 weeks and 6 days with symptoms of cold, shortness of breath, and cough since a week ago. She had received remdesivir ampoule, Tamiflu tablet, meropenem and linezolid, and dexamethasone. She received oxygen through a 14-liter reservoir bag mask and hydrocortisone, heparin, and ceftriaxone. Nine hours after hospitalization, the patient suffered a cardiorespiratory arrest, resuscitation was performed, and the patient was intubated. Emergency cesarean section was done in the intensive care unit. Finally, the patient suffered a cardiorespiratory arrest, prop was placed for the patient, and evidence of severe Mitral stenosis and right ventricle dilation were observed. The cardiopulmonary resuscitation operation continued for an hour, but unfortunately the patient died. So, it is important to be careful about influenza during pregnancy and in the case of heart failure symptoms, it is necessary to consider the presence of underlying mitral stenosis.

**Keywords:** Influenza, mitral valve stenosis, pregnancy

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## INTRODUCTION

Normal pregnancy is associated with a hyperdynamic state, which is characterized by increase of circulating blood volume. The maternal heart rate, the stroke volume of the left ventricle increases, and the systemic vascular resistance decreases.<sup>[1]</sup> This increase of about 50% may cause symptoms in a person with asymptomatic mitral valve stenosis (MVS) or worsen symptoms in a previously symptomatic patient and with the occurrence of tachycardia, it causes disruption in the left atrial emptying and higher pressure of the pulmonary capillaries.<sup>[2]</sup>

On the other hand, it is a proven fact that influenza A is more likely to patients with heart diseases, especially with MVS.<sup>[3]</sup> Influenza is an acute disease caused by infection with influenza viruses. It usually involves the upper and lower respiratory tracts and is associated with fever, headache, myalgia, and general weakness.<sup>[3]</sup> This disease usually occurs

every year, but it is different in terms of extent and intensity. Some patients suffer from pulmonary complications (such as pneumonia and chronic obstructive pulmonary disease, etc.) or extrapulmonary complications (such as Reye's syndrome, myocarditis, pericarditis, encephalitis, Guillain Barre Syndrome, Staphylococcal toxic shock syndrome, etc.).<sup>[4]</sup>

In fact, the presence of MVS in a patient makes him/her susceptible to influenza A. Therefore, patients with known lesions should be considered as high-risk candidates for influenza during epidemics.<sup>[5]</sup> Some studies stated that one of the complications caused by influenza can be acute cardiopulmonary failure.<sup>[6,7]</sup> Considering that, first, the prevalence of mitral valve disease, especially MVS, as the most common valve disease in pregnancy, increases the risk of maternal and fetal adverse outcomes, second, the influenza-related death rates for pregnant women is reported

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higher than other people.<sup>[8]</sup> The simultaneous occurrence of influenza and heart failure can be considered as a big challenge for physicians.<sup>[9]</sup>

For this purpose, in this study, a case of an influenza-infected pregnant woman with MVS has been reported.

## CASE REPORT

A 44-year-old pregnant woman at a gestational age of 28 weeks and 6 days (height: 158 cm, weight: 80.5 kg, body mass index: 32.25 kg/m<sup>2</sup> before pregnancy) referred to Amin Clinic with severe shortness of breath and cough and was transferred to the Najaf Abad Al-Zahra Hospital by Prehospital Care Emergency Medical Services. She had symptoms of cold, shortness of breath, and cough since a week ago. She also had a history of pregnancy hypothyroidism and use of levothyroxine. In the previous year, 1 week after preterm delivery and intrauterine fetal demise, the patient had sudden shortness of breath and cardiac arrest and was resuscitated. In the review of the last year's history, it was found that the patient had MVS and was not aware of her disease until then.

She did not refer to prenatal care and started it at gestational age of 15 weeks and 6 days under the supervision of a gynecologist.

At the time of admission, vital signs were T: 37.5°C, respiratory rate: 22 bpm, BP: 100/70 mmHg, O<sub>2</sub> sat: 93%, and Fetal heart rate: 145 bpm. The patient was receiving oxygen with a reservoir bag and was transferred to the maternity emergency triage and was visited by a gynecologist and consulted with an infectious disease specialist.

According to the infectious disease specialist consultation, remdesivir ampoule, Tamiflu tablet, meropenem 1 gr/TDS and linezolid 600 mg/BD, dexamethasone ampoule 8 mg/TDS, D-Dimer test, and examination of pulmonary thromboembolism (PTE) were ordered.

Blood tests, D-dimer test, and polymerase chain reaction rapid test were done. The results of the tests are presented in Table 1.

The results of the electrocardiogram were shown sinus tachycardia and EF: 55%-60%, Mild to Moderate tricuspid regurgitation, left atrial enlargement, and Mild to Moderate Mitral stenosis according to echocardiography.

In the results of computed tomography angiography, mild bilateral pleural effusion was also seen, and multilobar ground glass opacifications with peripheral and peribronchovascular distribution were evident in the parenchyma of the lungs, which have been introduced by the COVID-19 pneumonia. Pulmonary arteries were normally opacified and no evidence in favor of PTE was seen, and the final result was reported as CORADS = 5. Due to the infectious process of the lung and the negative result of the rapid PCR test, the suspicion of influenza was raised.

The O<sub>2</sub> sat level was rapidly decreasing, so that it decreased from 93% to 58% within half an hour. She was ordered to receive

**Table 1: Laboratory factors of the patient**

Parameter	Value	Parameter	Value
WBC	9,600	HCT	32.2
PLT	1,33,000	CRP	59
MCHC	33.1	BGRh	A <sup>+</sup>
HCT	35%	Hb	11.6
Neut	92.6%	BS	195
Bili (D)	0.3	Bili (T)	0.7
LDH	807	Uric Acide	6.4
Cr	0.7	BUN	12
K	3.9	Na	138
SGPT	22	SGOT	39
PT	13	PTT	35
D-Dimer	>8,000	INR	1
PO <sub>2</sub>	50.5	pH	7.2
HCO <sub>3</sub>	20.2	PCO <sub>2</sub>	43.8
PO <sub>2</sub> sat	79.4	Hematuria	Positive
Proteinuria	Positive	Bacteriuria	Moderate
Urobilinuria	Positive	PCR	Negative

oxygen through a 14-liter reservoir bag mask, suction the patient's secretions, and prescribed a 25 mg pethidine ampoule (in case of extreme restlessness) and was transferred to the isolated intensive care unit. No Stress Test was also performed.

According to Internists advice, bilateral lung auscultation was performed with wheezing on both sides, which was ordered duolin nebulizer, nasal oxygen 3-5 liters, hydrocortisone 100 mg/TDS, heparin 5,000 u/TDS, and ceftriaxone ampoule 1 gr/BD. In addition, performing No Stress Test, receiving 4-5 liters of oxygen, Tamiflu tablets, and hydrocortisone ampoules were prescribed.

Nine hours after hospitalization, the patient suffered a cardiorespiratory arrest, resuscitation was performed, the patient was intubated, and to save the fetus, it was removed by emergency cesarean section in the intensive care unit. The baby girl was born with breech presentation, Apgar 1/10 and 6/10, and was transferred to labor for resuscitation, but unfortunately the baby died.

According to the cardiologist's visit, the mother's heart rhythm during cardiopulmonary resuscitation (CPR) was asystole and pulmonary edema was suggested as one of the possible causes of arrest. Again, no evidence of PTE was seen on repeat multidetector computed tomography.

Finally, the patient suffered a cardiorespiratory arrest the next morning. The resuscitation was performed, according to the report of the cardiologist, after cardiac arrest, Prop was placed for the patient, and evidence of severe MS and RV dilation were observed. The CPR operation continued for an hour with the presence of anesthetist, but unfortunately the patient died.

## DISCUSSION

In the present case report, a pregnant woman with MVS disease was introduced, who had influenza during pregnancy

and faced RV dilation following influenza-related pulmonary edema, suffered from cardiac arrest, and died. In this regard, it has been stated in many previous literatures that in a pregnant woman with MVS, the increase in blood volume and tachycardia causes disturbances in the left atrium emptying and, as a result, causes an intense increase in the pressure of the pulmonary capillaries.<sup>[4]</sup> This hemodynamic stress along with other reasons such as influenza, anemia, atrial fibrillation, and embolism may provide the basis for development of acute pulmonary edema and lead to cardiogenic shock and ultimately the maternal or fetal death.<sup>[10-12]</sup> In addition, some other studies have emphasized the occurrence of complications during influenza, such as the relative diastolic dysfunction of both ventricles in patients with septic shock, as well as the patients with left ventricular systolic dysfunction.<sup>[13-15]</sup> The results of the Vieillard-Baron *et al.* study indicated the dilatation of the right ventricle caused by acute respiratory distress syndrome.<sup>[16]</sup> Many other reports have mentioned to myopericarditis in acute influenza.<sup>[10-12]</sup> Although pregnant women have not been evaluated in the above studies, generally, it can approve the risk of simultaneous influenza and MVS, especially during pregnancy, because the mortality rate due to influenza in pregnant women is significantly higher than the nonpregnant women in the same age group.<sup>[8]</sup>

In the study of Nandwani *et al.*, a 19-year-old boy who referred to the hospital with evidence of acute respiratory distress syndrome was reported, and it was determined that he had viral pneumonia caused by influenza A virus, which induced the aggravation and development of MVS.<sup>[4]</sup> According to them, although patients with MVS are not associated with clear evidence of heart failure, but blood circulation factors may play a role in their death.<sup>[17]</sup>

Primary influenza viral pneumonia tends to occur in people with heart disease (especially MVS). It has been observed that the presence of MVS in a patient makes him susceptible to influenza A.<sup>[5]</sup> In addition, the autopsy sample of young women during the H1N1 influenza epidemic in the past years also showed grade 2 MVS.<sup>[18]</sup>

In our opinion, perhaps the most important cause of death in the present study was the lack of awareness about MVS disease and the implementation of appropriate treatment measures before and after pregnancy. Pregnant women with MVS have special and complex treatment problems. Mitral valve commissurotomy can be performed, but it is still associated with complications and a high mortality rate.<sup>[19]</sup> In the last few years, mitral balloon valvuloplasty has been performed during pregnancy and its short-term results have been reported to be excellent. Long-term follow-up of patients has also shown very few fetal complications in addition with the final and appropriate outcome of pregnancy.<sup>[9]</sup>

## CONCLUSION

It seems that during pregnancy, should be careful about influenza, and in the case of heart failure symptoms, it is

necessary to consider the presence of underlying mitral stenosis. As it reported in the present case, the patient presented with acute respiratory distress, and after rejecting the evidence of COVID-19 and PTE, it was diagnosed as a case of influenza, which coincided with an underlying but undiagnosed MVS disease.

## Ethics approval and consent to participate

Written informed consent was obtained from the patient after describing the aim and beneficial and harmful aspects of the study.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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