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Case Report

Emergency Pregnancy with Severe Preeclampsia and Total Atrioventricular Block In A 28-Year-Old Woman

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ABSTRACT

The co-occurrence of preeclampsia with bradycardia due to total atrioventricular block (TAVB) during pregnancy is a rare yet severe phenomenon. There is limited literature available on this specific combination. This case report aims to contribute valuable insights by documenting the clinical presentation and management of a 28-year-old woman who is diagnosed with severe preeclampsia and total atrioventricular block during pregnancy. A 28-year-old pregnant woman was referred to the emergency room with dyspnea and vaginal discharge. She had a history of cardiac issues, including atrial septal defect and total atrioventricular block. Her blood pressure was 206/129 mmHg, and a pulse rate of 67 beats per minute. Then, she was diagnosed with severe preeclampsia, hypertensive emergency, and impending eclampsia with a suspect congenital disease contributing to her atrioventricular block. The patient underwent urgent cesarean section intrauterine stabilization and received postoperative care. Postoperatively, the patient reported no further dyspnea or bradycardia. The history of salbutamol usage and the activation of plasminogen activator inhibitor-1 (PAI-1) in patients with atrial septal defects (ASD) is suspected as a potential ßetiological factor in the pathophysiology of preeclampsia during pregnancy. TAVB can be induced by congenital ASD. In conclusion, the use of salbutamol and activation of PAI-1 in patients with TAVB induced by ASD are suspected as potential causes of preeclampsia during pregnancy.

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INTRODUCTION

Hypertensive disorders during pregnancy constitute a critical global health concern, contributing significantly to maternal morbidity and mortality rates. These disorders are implicated in approximately 18% of all maternal deaths worldwide, affecting 5% to 10% of pregnancies. Preeclampsia, a distinctive complication characterized by resistant hypertension coupled with proteinuria or other adverse conditions, emerges as a prominent contributor to this alarming statistic. (Braunthal & Brateanu, 2019; Gardikioti et al., 2022).

Although bradycardia may be asymptomatic in many cases, symptomatic instances demand immediate intervention. The definitive management of this condition involves pacemaker implantation, although the necessity for this intervention has been controversial within the medical community (Angsubhakorn & Benditt, 2021).

Furthermore, in the context of Indonesia, a notable absence of reported cases involving bradycardia and severe preeclampsia during pregnancy adds to the scarcity of comprehensive guidelines for optimal management (Yafi et al., 2021). This case report seeks to contribute valuable insights by documenting the clinical presentation and management of a 28-year-old woman who presented with shortness of breath due to the rare coexistence of severe preeclampsia and total atrioventricular block during pregnancy, shedding light on the challenges and considerations in addressing such complex scenarios.

CASE REPORT

A 28-year-old woman went to the Emergency Room of the Regional Hospital of Dr. Saiful Anwar and presented with complaints of dyspnea and fluid discharge from the birth canal. The patient, a referral case, was diagnosed as G2P0A1 at 38-39 weeks of pregnancy with total atrioventricular (AV) block due to a suspected congenital disease. She reported dyspnea accompanied by headaches and had a history of atrial septal defect (ASD) and AV block, maintaining a pulse rate of 40-60 beats per minute. The patient regularly consumed Salbutamol 1x1 tablet due to her cardiac conditions. No history of diabetes or hypertension was reported before or during pregnancy, and she denied any asthma history. The patient had experienced vaginal discharge for the past month, left untreated. In the previous year (2022), she underwent surgery for a perforated appendix, and in the preceding pregnancy (2021), she had an abortion.

The patient had a history of 10 antenatal care (ANC) visits to an obstetrician, 2 to a midwife, and 1 to a community health center. Her pre-pregnancy weight was 50 kg, increasing to 75 kg during pregnancy, with a height of 158 cm (BMI: 30 kg/m2). No signs of uterine hyperstimulation were observed, but fluid discharge from the vaginal orifice was evident. Laboratory results are detailed in Table 1. Chest X-ray (January 10, 2024) revealed cardiomegaly

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Table 1. Laboratory Examination Result of the Patient

Complete Blood Count	Value
Hemoglobin	11.8 gr/dl
Leukocyte	10350 /µl
Platelet	279000/µl
Liver Function	
PPT	9.9 (10.9)
aPPT	25.6 (24.8)
OT/PT	51/15
Albumin	3.53
Random Blood Glucose	114 gr/dl
Troponin I	1.5
Serum Electrolyte	129/3.77/99
Ur/Cr	11.9/0.46

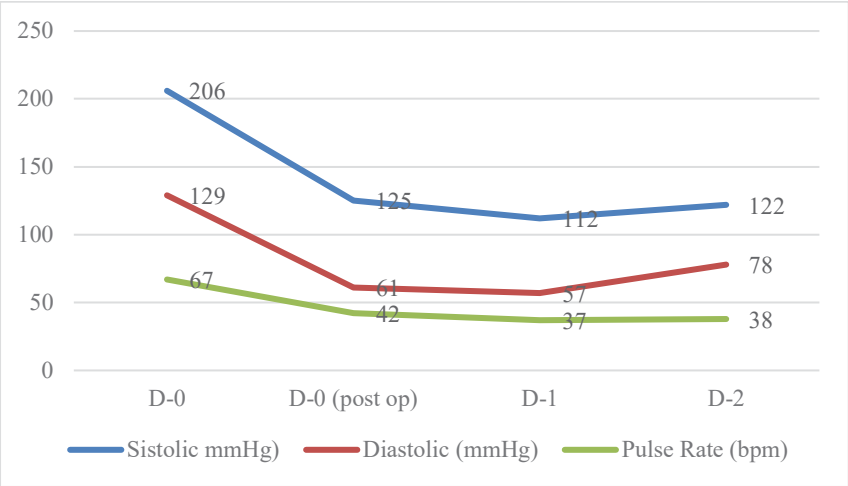

Figure 1. Post-Operation's Vital Sign of the Patient

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Based on the findings, the patient was diagnosed with Shortness of Breath (SOB) et causa Acute Lung Edema (cardiogenic vs. non-cardiogenic), hypertensive emergency, impending eclampsia, severe preeclampsia, small ASD, asymptomatic TAVB due to suspect congenital disease, premature rupture of membranes (PROM), bradycardia, and a history of appendicitis surgery (2022). The patient underwent intrauterine stabilization and resuscitation with left lateral tilt positioning. Oxygen was administered at 10 L/min via a non-rebreather mask. A slow bolus of 4 grams of 20% MgSO4 was given, followed by a drip of 40% MgSO4 at 6 grams in 500 cc Ringer's lactate at a rate of 1 gram/hour until 24 hours post-partum. Urgent cesarean section and intrauterine device (IUD) insertion were performed. During the surgery, a pacemaker was implanted by the cardiothoracic surgeon (TS), resulting in a heart rate of 70-80 bpm. The patient also received management from Cardiology Department, which included the administration of Captopril at a dosage of 3 times daily, each with 1.25 mg, and Nifedipine at a dosage of 3 times daily, each with 10 mg. Postoperatively, the patient reported no further dyspnea or bradycardia. The post-Cesarean section blood pressure and pulse rate can be observed in Figure 1.

DISCUSSION

The presented case of a 28-year-old woman with concurrent severe preeclampsia and total atrioventricular block highlights the intricate challenges associated with the management of rare and complex conditions during pregnancy. Hypertensive disorders, particularly preeclampsia, remain a significant global health concern due to their impact on maternal and fetal well-being. In this case, the patient not only faced the severe complications of preeclampsia but also exhibited a rare cardiac manifestation in the form of total atrioventricular block.

Preeclampsia, a complex multisystem disorder exclusive to pregnancy, manifests with hypertension and end-organ dysfunction. Its severe forms pose significant morbidity and mortality risks, emphasizing the critical importance of timely diagnosis and management. Managing preeclampsia demands a delicate equilibrium between controlling hypertension to mitigate maternal complications and ensuring fetal well-being through timely delivery. Striking this balance involves intricate decision-making (Chang et al., 2023; Sungkar et al., 2021).

Intriguingly, the co-occurrence of total atrioventricular block during pregnancy in this case, adds a rare and unexpected dimension to the clinical scenario. Although often asymptomatic, the manifestation of bradycardia necessitated urgent intervention, highlighting the complexity of cardiovascular complications during gestation. The etiology of total atrioventricular block is diverse, encompassing congenital and acquired factors. The patient's history of atrial septal defect (ASD) and atrioventricular block (AV block) further complicates the understanding of her cardiac condition, presenting a unique set of challenges for medical management (He et al., 2020).

This intricate cardiovascular adaptation is crucial for meeting the increased demands imposed by the physiological changes during gestation. Interestingly, existing research has suggested a potential correlation between grand multiparity and augmentation in midlife atrial conduction time, adding another layer to the intricate interplay of factors affecting cardiac dynamics (Nakashima et al., 2019). The physiological changes during pregnancy and peripartum significantly affect cardiovascular

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hemodynamics, resulting in adaptive myocardial remodeling (Sundararaman et al., 2016). Arrhythmias of the atrium and ventricle may be more likely to occur during pregnancy due to structural alterations linked to atrial and ventricular remodeling. Post-partum bradycardia, a phenomenon potentially observed in women with TAVB, might be influenced by a gradual reduction in sympathetic nervous system activity. This gradual decline in sympathetic tone contributes to normalizing heart rate post-partum, reflecting the intricate interplay between hormonal fluctuations and autonomic regulation in the cardiovascular system (Nakashima et al., 2019; Parikh et al., 2018). In this patient, there was a decrease in pulse rate following postoperative care after the cesarean section.

An increased prevalence of airway hyperresponsiveness was identified in a cohort of unrepaired adult patients with atrial septal defects (ASD), according to a prior study. The research established a correlation between asthma-like symptoms and ASD in adults. Acquiring a more comprehensive comprehension of dyspnea associated with ASD may reduce the risk of complications resulting from prolonged right ventricular volume overload and prevent delays in the treatment of unrepaired ASD. A prior inquiry into the electrophysiological effects of salbutamol administration revealed several modifications, including atrioventricular delay and reduced refractoriness of the atrium and ventricle. As a result, consistent administration of salbutamol to patients may elevate the incidence of preeclampsia in expectant women [OR = 1.15] (Namazy & Schatz, 2014; Nassif et al., 2018; Syed et al., 2021). The individual being evaluated has a documented record of taking Salbutamol tablets daily, which is consistent with the increased incidence of preeclampsia linked to Salbutamol usage.

Previous research has brought to light the involvement of plasminogen activator inhibitor-1 (PAI-1) mutation activation in individuals diagnosed with atrial septal defects (ASD), contributing to the development of Chronic Thromboembolic Pulmonary Hypertension (Kilinc et al., 2020). In the context of preeclampsia, heightened levels of PAI-1 have been identified in both the plasma and syncytium of affected women. This observation underscores the potential significance of PAI-1 in the pathogenesis of preeclampsia, where imbalances in this crucial regulator may lead to endothelial dysfunction. Such dysfunction, in turn, can stimulate the production of leukocyte-endothelial adhesion molecules, playing a pivotal role in mediating the adherence of inflammatory cells to arterial walls, particularly in the arteriolar bed of the spiral arteries (Godtfredsen et al., 2022). Understanding the molecular interplay involving PAI-1 sheds light not only on its implications in ASD-related complications such as Chronic Thromboembolic Pulmonary Hypertension but also on its involvement in the pathophysiological mechanisms of conditions like preeclampsia. The intricate connections between genetic factors, PAI-1 mutations, and endothelial dysfunction provide valuable insights that may pave the way for more targeted and personalized therapeutic approaches in managing cardiovascular and pregnancy-related complications. In this patient, a cardiac disorder in the form of atrial septal defect (ASD) has been identified, the mechanisms of which could potentially influence the development of preeclampsia during pregnancy.

Previous utilization of intrauterine devices (IUDs) has been linked to a diminished risk of preeclampsia, as evidenced by an odds ratio (OR) of 0.76 with a 95% confidence interval (CI) ranging from 0.58 to 0.98. Among contraceptive methods, the most effective and

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associated with minimal risk for individuals with a history of preeclampsia is the immediate post-partum insertion of an intrauterine device (IUD). This finding underscores the potential benefits of IUD use in post-partum management, highlighting its role not only as an effective contraceptive method but also as a potential mitigator of preeclampsia risk in subsequent pregnancies. In this patient, intrauterine device (IUD) placement was performed following the cesarean section procedure (Parker et al., 2016; Terefe et al., 2023). The scarcity of literature on the coexistence of severe preeclampsia and total atrioventricular block during pregnancy highlights the need for further research and comprehensive guidelines. The absence of reported cases in Indonesia adds to the global literature gap, emphasizing the importance of documenting and analyzing such occurrences to enhance our understanding of these complex clinical scenarios. This case report contributes valuable insights for healthcare practitioners facing similar challenges, offering a basis for future research and guideline development in managing rare combinations of hypertensive disorders and cardiac complications during pregnancy.

CONCLUSION

The potential association between the use of salbutamol and the activation of PAI-1 in patients with TAVB induced by ASD and their suspected role as contributors to the development of preeclampsia during pregnancy underscores the complexity of managing such cases. A comprehensive and careful approach to management is essential, emphasizing the necessity of collaborative efforts from various medical departments. This multi-disciplinary collaboration becomes crucial in ensuring the mother's and baby's safety and well-being.

REFERENCES

Angsubhakorn, N., & Benditt, D. (2021). Relative Sinus Bradycardia: An Unexpected Finding in Preeclampsia With Acute Pulmonary Edema. *Cureus*. https://doi.org/10.7759/cureus.13262

Braunthal, S., & Brateanu, A. (2019). Hypertension in pregnancy: Pathophysiology and treatment. *SAGE Open Medicine*, *7*, 205031211984370. https://doi.org/10.1177/2050312119843700

Chang, K.-J., Seow, K.-M., & Chen, K.-H. (2023). Preeclampsia: Recent Advances in Predicting, Preventing, and Managing the Maternal and Fetal Life-Threatening Condition. *International Journal of Environmental Research and Public Health*, *20*(4), 2994. https://doi.org/10.3390/ijerph20042994

Gardikioti, A., Venou, T.-M., Gavriilaki, E., Vetsiou, E., Mavrikou, I., Dinas, K., Daniilidis, A., & Vlachaki, E. (2022). Molecular Advances in Preeclampsia and HELLP Syndrome. *International Journal of Molecular Sciences*, *23*(7), 3851. https://doi.org/10.3390/ijms23073851

Godtfredsen, A. C., Sidelmann, J. J., Dolleris, B. B., Jørgensen, J. S., Johansen, E. K. J., Pedersen, M. F. B., Palarasah, Y., & Gram, J. B. (2022). Fibrinolytic Changes in Women with Preeclampsia. *Clinical and Applied Thrombosis/Hemostasis*, *28*, 107602962211261. https://doi.org/10.1177/10760296221126172

He, C., Zhou, Y., Tang, S.-S., Luo, L.-H., & Feng, K. (2020). Completed atrioventricular block induced by atrial septal defect occluder unfolding: A case report. *World Journal of Clinical Cases*, *8*(22), 5715–5721. https://doi.org/10.12998/wjcc.v8.i22.5715

QANUN MEDIKA
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http://journal.um-surabaya.ac.id/index.php/qanunmedika

Irianti, S., Tjandraprawira, K. D., Sumawan, H., & Karwiky, G. (2022). Total atrioventricular block in pregnancy – Case report. *Annals of Medicine & Surgery*, *75*. https://doi.org/10.1016/j.amsu.2022.103441

Kilinc, M., Yaylali, Y. T., Yildizeli, B., & Tas, S. (2020). Chronic Thromboembolic Pulmonary Hypertension Secondary to Thrombophilia and Incidentally Diagnosed Atrial Septal Defect. *JACC: Case Reports*, *2*(4), 658–661. https://doi.org/10.1016/j.jaccas.2020.01.016

Nakashima, A., Miyoshi, T., Aoki-Kamiya, C., Nishio, M., Horiuchi, C., Tsuritani, M., Iwanaga, N., Katsuragi, S., Neki, R., Ikeda, T., & Yoshimatsu, J. (2019). Predicting post-partum cardiac events in pregnant women with complete atrioventricular block. *Journal of Cardiology*, *74*(4), 347–352. https://doi.org/10.1016/j.jjcc.2019.04.002

Namazy, J. A., & Schatz, M. (2014). The safety of asthma medications during pregnancy: an update for clinicians. *Therapeutic Advances in Respiratory Disease*, *8*(4), 103–110. https://doi.org/10.1177/1753465814540029

Nassif, M., van Steenwijk, R. P., Hogenhout, J. M., Lu, H., de Bruin-Bon, R. H. A. C. M., Hirsch, A., Sterk, P. J., Bouma, B. J., Straver, B., Tijssen, J. G. P., Mulder, B. J. M., & de Winter, R. J. (2018). Atrial septal defect in adults is associated with airway hyperresponsiveness. *Congenital Heart Disease*, *13*(6), 959–966. https://doi.org/10.1111/chd.12665

Parikh, N. I., Kapphahn, K., Hedlin, H., Olgin, J. E., Allison, M. A., Magnani, J. W., Ryckman, K. R., Waring, M. E., Perez, M. V., & Howard, B. V. (2018). Effects of reproductive period duration and number of pregnancies on midlife ECG indices: a secondary analysis from the Women's Health Initiative Clinical Trial. *BMJ Open*, *8*(8), e019129. https://doi.org/10.1136/bmjopen-2017-019129

Parker, S., Jick, S., & Werler, M. (2016). Intrauterine device use and the risk of preeclampsia: a case–control study. *BJOG: An International Journal of Obstetrics & Gynaecology*, *123*(5), 788–795. https://doi.org/10.1111/1471-0528.13413

Sundararaman, L., Hochman Cohn, J., & Ranasinghe, J. S. (2016). Complete heart block in pregnancy: case report, analysis, and review of anesthetic management. *Journal of Clinical Anesthesia*, *33*, 58–61. https://doi.org/10.1016/j.jclinane.2016.01.021

Sungkar, A., Irwinda, R., Surya, R., & Kurniawan, A. P. (2021). *Maternal Characteristics, Pregnancy, and Neonatal Outome in Preeclampsia and HELLP Syndrome: a Comparative Study*. *9*(1). https://doi.org/10.23886/ejki.9.15

Syed, S. A., Sherwani, N. Z. F., Riaz, B., Iqbal, J., Chaudhry, M., Abdullah, M., & Malik, A. (2021). Short-Term Effect of Inhaled Salbutamol on Heart Rate in Healthy Volunteers. *Cureus*. https://doi.org/10.7759/cureus.13672

Terefe, G., Wakjira, D., & Abebe, F. (2023). Immediate post-partum intrauterine contraceptive device use among pregnant women attending antenatal clinics in Jimma town public healthcare facilities, Ethiopia: Intentions and barriers. *SAGE Open Medicine*, *11*, 205031212311572. https://doi.org/10.1177/20503121231157212

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JURNAL KEDOKTERAN FKUM SURABAYA
http://journal.um-surabaya.ac.id/index.php/qanunmedika

Yafi, D. A., Noviani, C., Saputri, R. E., Purnawarman, A., Andalas, Mohd., & Yusmalinda, Y. (2021). Complete Heart Block In Pregnancy : A Case Report. *Indonesian Journal of Cardiology*. https://doi.org/10.30701/ijc.1015