

OUTCOME OF PERIPARTUM ANESTHESIA IN WOMEN WITH VALVULAR DISEASE

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Abstract

Objective: Maternal heart disease is one of the major causes for mortality among parturients. In our study, we surveyed 220 patients with different valvular disorders who gave birth in our medical center in the years 2012–2018. The aim of this study was to characterize various valvular pathologies and compare the results of different anesthetic approaches. **Methods:** In this retrospective study, the computerized system and file archive were searched for maternal valvular pathologies according to the International Classification of Diseases, Ninth Revision (ICD-9). The women included in the study were defined as American Society of Anesthesiology (ASA)-II or more, who suffer from valvular heart disease. **Results:** The most common pathology was mitral valve regurgitation (57.73% of all cardiac patients). Most women were defined as having mild insufficiency, and 82.68% had normal vaginal delivery. In 17.3% of patients who had cesarean section, the main type of anesthesia was neuraxial anesthesia (95.45%). The second most common pathology was tricuspid valve regurgitation (22.73%). Most patients (78%) had normal vaginal delivery, and epidural analgesia was used in 64.1%. A minority of cardiac patients in our study were patients with stenotic heart diseases, such as aortic stenosis, mitral stenosis and pulmonic stenosis (8.18%, 4.55%, and 1.36%, respectively). No complications were observed in the peripartum period. **Conclusion:** The use of regional anesthesia is recommended for all valvular pathologies without exception, as we observed no cases in which the severity of cardiac condition had not allowed the use of various types of regional anesthesia, for surgery or vaginal delivery.

Keywords

anesthesia • obstetric • pregnancy • valvular heart disease

Introduction

Maternal heart disease is one of the major causes of mortality among parturients. In the developing world, mortality due to heart disease can reach up to 20% of all causes of death [1]. In developed and industrialized countries, maternal heart disease complicates 1%–3% of births, and the mortality rate can reach as much as 15% [2, 3]. The evidence that heart disease is a significant issue, even in the developed world, is that the rate of mortality due to maternal heart disease in the UK in 2009–2014 was 2 out of 100,000 cases [4]. It is important to characterize the epidemiology of heart diseases in each country and their populations, as there is a difference in the prevalence of different heart diseases in different populations. Literature data shows that during pregnancy, prevalence of rheumatic heart disease is around 60%, prevalence of congenital heart disease is about 20%, and acquired heart diseases account for about 10% of the cases [5, 6].

In our retrospective study, we surveyed 220 patients with different valvular disorders who gave birth at Shaare Zedek Medical Center (SZMC) from 2012 to 2018. The aim of this study was to characterize various valvular pathologies and to compare the results of different anesthetic approaches.

Materials and methods

In this retrospective study, we surveyed all births between 2012 and 2018 at the SZMC as well as at the BikurHolim Hospital that is a campus of SZMC.

This research was approved by the SZMC Institutional Review Board (Helsinki Committee) (SZMC-10418, Ioscovich).

The computerized system of SZMC (AZMA) and file archive were searched for maternal valvular heart diseases according to the International Classification of Diseases, Ninth Revision (ICD-9). The search was performed by two researchers (JM and BD). The women included in the study were defined as American

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Society of Anesthesiology (ASA)-II or more, who suffer from valvular heart diseases that are classified by dominant pathology.

All filled data forms were transferred into Excel, Microsoft, and data analysis was performed with SPSS software, version 19.

Results

Between 2012 and 2018, approximately 100,000 births were surveyed, of which 225 met the inclusion criteria. Of these patients, five women were excluded from the study because of inability to access their medical information. A total of 220 parturients were included in the study (Table 1).

The most common pathology was mitral valve regurgitation (MR), which was found in 57.73% of all cardiac patients or 0.127% of women giving birth at the medical center during the study period. The majority of women with MR were defined as having mild insufficiency, and 82.68% had normal vaginal delivery (NVD). Also, 71.43% of women who had NVD received epidural analgesia. In 17.3% of patients who had elective or emergent cesarean section, the main type of

anesthesia was neuraxial anesthesia (95.45%) (Table 2).

The second most common pathology was tricuspid valve regurgitation (TR), which was found in 22.73% of all included patients or 0.05% of women giving birth at the medical center during the study period. Most patients (78%) had NVD, and epidural analgesia was received by 64.1% of the patients. Furthermore, majority of the patients who had cesarean section were managed with neuraxial anesthesia (91%).

A minority of cardiac patients in our study were patients with stenotic heart diseases such as aortic stenosis (AS) (Table 3), mitral stenosis (MS), and pulmonic stenosis (PS), found in 8.18%, 4.55%, and 1.36%, respectively.

Discussion

According to the study results, the most common valvular heart disease among parturients was MR, whose prevalence was 0.127% of women giving birth at the medical center in the relevant age range. This prevalence is relatively low compared to statistics in developed and developing countries [7, 8]. This can be explained by effective prophylactic treatment of women with rheumatic heart disease. An absolute majority of

Table 1. Summary of data analysis

Pathology	Number out of 220	% from 220	% from the general population	% of ASA-II	% of NVD	% of C/S	% NVD + NA	% C/S + GA	% of C/S and NA
Mitral insufficiency	127	57.73	0.127	95.28	82.68	17.32	71.43	4.55	95.45
Mitral stenosis	10	4.55	0.01	90	70	30	71.43	0	100
Aortic insufficiency	9	4.09	0.008	66.67	67	33	50	0	100
Aortic stenosis	18	8.18	0.018	83.33	50	50	66.67	0	100
Tricuspid insufficiency	50	22.73	0.05	88.00	78	22	64.10	9	91
Tricuspid stenosis	0	0	0	0	0	0	0	0	0
Pulmonary insufficiency	3	1.36	0.004	100	66.67	33.33	50	0.00	100
Pulmonary stenosis	3	1.36	0.004	100	100	0	66.67	0	0

Key: ASA, American Society of Anesthesiology; C/S, cesarean section; GA, general anesthesia; NA, neuraxial analgesia/anesthesia; NVD, normal vaginal delivery.

Table 2. Characteristics of patients with Mitral incompetence

Mitral incompetence			
Total			127
Age (years)			27–41
ASA	ASA-II 121 (95.28%)	ASA-III 6 (4.72%)	Total 127 (100%)
Vaginal delivery	With epidural anesthesia 75 (71.43%)	Without epidural anesthesia 30 (22.57%)	Total 105 (100%)
Cesarean section	Regional anesthesia 21 (95.45%)	General anesthesia 1 (4.55%)	Total 22 (100%)

Key: ASA, American Society of Anesthesiology.

patients with MR belonged to ASA-II class and New York Heart Association (NYHA)-II meaning minimal heart failure, and only 4.7% had signs of NYHA-III heart failure. Women who had NVD received epidural analgesia more than those in the general population (71.43% vs. 15%–60%, respectively) [9–12]. The explanation for this is the fact that epidural anesthesia for parturients with MR decreases systemic vascular resistance, resulting in reduced chance of developing heart failure during labor.

Women with known cardiac problems went through our antenatal clinic for detecting high-risk patients and received an anesthetic management plan for labor and delivery that was tailored to their comorbidity [13].

During cesarean section, there were no anesthetic complications in this group. All women with ASA-III class had vaginal delivery without complications. The average number of hospitalization days of women with MR after cesarean delivery did not exceed the recommended number of hospitalization days in our institution. We demonstrated that regional anesthesia in both vaginal and cesarean delivery results in good outcomes and hemodynamic stability and it can certainly be a preferred anesthesia method for patients with signs of heart failure, as evidenced by additional literature data [14, 15].

The most difficult pathologies for peripartum anesthetic management, with the highest complication rate, were stenotic heart diseases such as AS or MS. The complications included pulmonary edema, arrhythmias, hemodynamic instability, and maternal death, mainly as a result of AS [16, 17]. In our study, there were a total of 31 patients with stenotic heart diseases, which included mainly those with AS or MS.

The incidence of MS has been decreasing in the light of effective treatment of rheumatic heart disease. On the other hand, the incidence of AS remains high due to a different etiology such as bicuspid aortic valve [18, 19]. The severity of heart disease among patients with AS in our institution was not high: 16.6% had NYHA-III class and there were no patients

with NYHA-IV class. Similar data were obtained in a group of patients with MS (10% had NYHA-III class). Compared to previous studies, prevalence of cesarean sections among women with AS was high relative to the general population in our study (50% vs. 15%–60%) [9–12]. The incidence of cesarean sections was also higher in the group of MS patients (30% vs. 15%–60%) [9–12]. Regional anesthesia was used as the choice of anesthesia type for cesarean delivery. In most patients with moderate and severe AS, the anesthesia type was combined spinal epidural (CSE) that includes low-dose spinal anesthesia combined with slow titrated epidural anesthesia. Only four women with AS had received spinal anesthesia. Women with MS and AS who had vaginal delivery received epidural analgesia in 71.4% and 66.6% of the cases, respectively. No complications were observed in the peripartum period, but it should be noted that any patient who showed signs of heart failure after cesarean delivery had a prolonged monitoring in post-anesthesia care unit (PACU) to identify and treat immediate postpartum complications such as pulmonary edema or arrhythmias that may develop in the first hours after delivery [16, 20, 21].

Fewer patients were found with aortic insufficiency (AI) than in other groups, meaning that the pathology is very rare in pregnant women. Among these patients, two thirds had NYHA I–II class and one third had clear signs of heart failure. All women who underwent cesarean section received regional anesthesia, with no anesthetic complications. This emphasizes that regional anesthesia is a safe anesthetic option for women with different types of aortic valve pathologies.

Conclusion

According to the study results, the prevalence of valvular heart disease in parturients is relatively rare. Most women are in stable condition and can undergo vaginal delivery with minimal chance of complications.

Table 3. Characteristics of patients with Aortic stenosis

		Aortic stenosis		
Total		18		
Age (years)		20–41		
ASA		ASA-II 15 (83.33%)	ASA-III 3 (16.67%)	Total 18 (100%)
Vaginal delivery	With epidural anesthesia 6 (66.67%)	Without epidural anesthesia 3 (33.33%)		Total 9 (100%)
Cesarean section	Regional anesthesia 9 (100%)	General anesthesia 0 (0%)		Total 9 (100%)

Key: ASA, American Society of Anesthesiology.

Use of regional anesthesia is recommended for all patients with valvular pathologies, except for those with decompensated heart failure. No cases have been observed in which severity of cardiac condition has not allowed the use of various types of regional anesthesia for surgery or vaginal delivery.

The limitation of this work is that it is an observational study and no controlled comparison of the different anesthesia approaches has been performed – general anesthesia versus regional anesthesia. In addition, no controlled comparison has been made between the outcomes of women giving NVD versus women delivered by cesarean section.

It can be concluded that regional anesthesia is superior to general anesthesia and is safe in women with compensated valvular heart disease. However, further research is needed.

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