

Medical reasons that cause the postponement of scheduled pediatric cardiovascular surgeries in a tertiary center in Turkey: what should be the limit of postponement?

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Keypoints

Surgery is a very stressful experience not only for the child being operated on, but also for the family. The aim of the pre-operative evaluation is to reduce perioperative morbidity and mortality risks. However, postponement of a scheduled operation sometimes cannot be avoided. It is important to develop some strategies to limit the postponement rates without neglecting the surgical safety of children to facilitate the perioperative rational planning and management of the scheduled operations

Abstract

Background

Preoperative evaluation and elimination of the identified medical problems is one of the most important steps of surgeries to reduce perioperative morbidity and mortality risks.

The aim of this study is to present the medical reasons which resulted in the postponement of scheduled pediatric cardiovascular surgeries in our center and to discuss what should be the limit of surgical postponement rates.

Patients and methods

This retrospective study included 123 pediatric patients whose scheduled cardiovascular operations were postponed in Kartal Koşuyolu Research and Training Hospital from April, 2014 to May, 2015. The postponement rates due to medical reasons were calculated and correlations between the age and gender of children, type of surgery and postponement were analyzed statistically.

Results

Out of 380 scheduled children, 0 to 16 years old (mean age 4.2±5.1 years), 123 were postponed 1 to 7 days (mean 3.8±2.4 days) before the planned date of operation. The postponement rate was 32.3%. Medical reasons for the postponement were lower (53.7%) or upper respiratory tract (15.4%) infections, neurologic (8.2%), urinary tract (6.5%) or gastroenterologic diseases (5.7%), endocrinologic (5.7%) or hematologic (3.2%) abnormalities and varicella infection (2.6%). Postponement was found to have a significant relationship with the age ($p<0.05$), but not with the gender of the children or type of the scheduled operation ($p>0.05$).

Conclusion

As a tertiary center that accepts children from various regions of the country, we should develop some strategies to decrease the postponement rates for rational use of the operating theaters without neglecting the

preoperative evaluation for surgical safety.

Keywords: Cardiovascular surgery, medical reasons, pediatric patients, postponement rate

Introduction

Surgery is a very stressful experience not only for the child being operated on, but also for the family. Postponement of a scheduled operation creates an emotional trauma to the family and the operation team, but sometimes it can not be avoided. The aim of preoperative medical assessment of the patients is to reduce perioperative morbidity and mortality risks. Several studies have indicated that preoperatively optimized patients experience safer surgical and anesthesia procedures^[1,2]. All children scheduled for cardiovascular surgery in our center are evaluated by both the pediatrician and the anesthesiologist before the operation. In this study, identified medical reasons to postpone the pediatric cardiovascular surgeries in one year period were presented and what should be the extent of surgical postponement was discussed.

Patients and methods

The preoperative evaluation records of 380 children scheduled for cardiovascular surgeries in Kartal Koşuyolu Research and Training Hospital from April, 2014 to May, 2015 were analyzed retrospectively. All children accepted for the surgery in our center are evaluated by the pediatrician on the day of hospital admission, 1 to 3 days before preparation of the elective surgery list and by an anesthesiologist just before the operation. If there is a medical problem in the history, physical examination or in the laboratory results of any children; the surgical team and the family are informed 1 to 7 days (mean 3.8 ± 2.4 days) before the planned date of operation about the necessity of postponement. After further assessment and/or medication is completed, the child is put on the operation list again. The means and the standart deviations of the age and gender of the postponed and nonpostponed children were calculated on Microsoft Excel Programme. The postponement rates

and the ratios of defined medical reasons were reported as percentages. The correlations between the age and gender of the children or type of cardiovascular surgery and postponement were analyzed statistically by the chi-square test. The p values below 0.05 were accepted as statistically significant.

Results

123 children out of 380 had their scheduled cardiac operations postponed due to the medical reasons in one year period, from April, 2014 to May, 2015. The postponement rates of our tertiary referral center was 32.3%. Of these 123 children, 65 (52.8%) were females (mean age 3.6 ± 4.4 years) and 58 (47.2%) were males (mean age 3.4 ± 4.2 years). After their medical therapy and further investigations were completed, the children were operated with a delay ranging from 3 days to 21 days (mean 12.4 ± 5.9 days). The most common medical reason for the postponement was lower respiratory tract pathologies: 66 (53.7%) children, 36 females and 30 males (54.5% and 45.4% respectively), had their operations postponed due to pneumonia, bronchiolitis/bronchitis or the suspicion of various interstitial pulmonary diseases like tuberculosis. Other medical reasons for the postponement were as follows in descending order of frequency: 19 cases (15.4%) of upper respiratory tract infections (rhinorrhea, farangitis, sinusitis, otitis media), 10 cases (8.2%) of neurologic diseases (afebrile seziures, cerebral palsy, hypotonia, epileptic disorder), 8 cases (6.5%) of renal pathologies (urinary tract infection, hydronephrosis, high blood urea-creatinin levels, glomerulonephritis), 7 cases (5.7%) of gastroenterological disorders (gastroenteritis, recurrent vomiting attacks, intestinal parasites), 7 cases (5.7%) of endocrinological problems (hypothyroidism, tiroiditis), 4 cases (3.2%) of hematologic abnormalities (trombocytopenia, leukopenia) and 2 cases (1.6%) of varicella infection (Table1). The cardiovascular pathologies of these children were as follows: 76 were scheduled for ventricular/atrial septal). defect (VSD/ASD) operations, 144 for vascular surgeries, 60 for various valve pathologies,

94 for combined cardiovascular surgeries and 6 for other cardiovascular surgeries as tumor resection or pacemaker implantation. A statistically significant relationship was found between the age of children and the postponement (p:0.02). However, there was no significant correlation between the gender of the children or type of the scheduled surgery and the postponement (p:0.08 and p:0.06 respectively) (Table 2).

Medical Reasons of Postponing Surgery	Female (n)	Ratio (%)	Male (n)	Ratio (%)	Total (n)	Ratio (%)
Lower respiratory tract pathologies (pneumonia, bronchitis, tuberculosis etc.)	36	55.4	30	51.8	66	53.7
Upper respiratory tract infections (rhinorrhea, farangitis, sinusitis, otitis media)	9	13.9	10	17.2	19	15.4
Neurologic diseases (afebrile seizure, cerebral palsy, hypotonia, epileptic disorder)	4	6.2	6	10.3	10	8.2
Renal pathologies (urinary tract infection, hydronephrosis, high blood urea-creatinine)	5	7.6	3	5.2	8	6.5
Gastroenterological disorders (gastroenteritis, recurrent vomiting attacks, intestinal parasites)	3	4.6	4	6.9	7	5.7
Endocrinological problems (hypothyroidism, thyroiditis)	4	6.2	3	5.2	7	5.7
Hematologic abnormalities (trombocytopenia, leukopenia)	3	4.6	1	1.7	4	3.2
Varicella (chickenpox infection)	1	1.5	1	1.7	2	1.6
Total	65	100	58	100	123	100

Table 1. Analysis of Medical Reasons for Postponing the Pediatric Cardiovascular Surgeries

Demographic and Medical Factors	Postponed (n) 123	Nonpostponed (n) 257	Statistical significance (p value)
Age	3.8±2.4 years	4.8±5.2 years	0.02*
Gender	Female 65 Male 58	Female 113 Male 144	0.08
Scheduled for VSD, ASD	20	56	0.06
Scheduled for Vascular surgeries	47	97	0.06
Scheduled for various Valve pathologies	14	46	0.06
Scheduled for Combined Surgery	40	54	0.06
Other surgeries (intra-cardiac tumor resection, pacemaker implantation etc.)	2	4	0.06

Table 2. Comparative analysis of demographic and medical factors between the postponed and nonpostponed preoperative patients (statistically significant p<0.05).

Discussion and conclusion

Comprehensive preoperative evaluation of the patients for estimation of their perioperative morbidity and mortality risks is important to raise the quality and efficacy of the surgical procedures [3]. The preoperative evaluation of the children is more complicated than adults because of the fact that medical history and the complaints must be obtained from their parents, relatives, other caregivers and/or previous medical records of their physicians [1]. Children who have various medical problems other than the current cardiovascular pathologies must be carefully identified by a pediatrician so that necessary consultations can be performed and medication can be given if necessary preoperatively [4]. It is also important to inform the surgical team and the families about the medical problems related with the postponement on time to reorganize the operation list for the rational use of operating theaters. In our study, the

postponement rate due to medical reasons was 32.3%. This rate seems to be higher compared to the limited number of similar studies in the literature. Abdel Wahab et al from Egypt reported their surgical postponement rates due to medical reasons as 25% and Rakesh Garg et al from India as 10.8% [5,6]. Our hospital is a tertiary care referral center for pediatric cardiovascular surgeries. As it is free of cost, most of the children admitted for the operation come from lower socio-economic and cultural regions. These children usually have various medical problems not realized or not properly handled by their parents. They usually have various systemic problems as recurrent and long lasting upper or lower respiratory tract infections, urinary, gastrointestinal tract or genetic pathologies related with poor nutritional care, low hygiene, bad sanitation facilities and/or living in crowded homes and frequent consanguineous marriages [7]. All accepted children are examined and have their medical history, laboratory test results, chest roentgenograms evaluated by a pediatrician on the day of hospital admission and an anesthesiologist just before the operation in our center. The families and the operation team of the children whose operations need to be postponed are informed 1 to 7 days (mean 3.8 ± 2.4 days) before the planned date of operation to provide rational use of operating rooms. After their medical therapy and further investigations are completed, these children are operated with a delay ranging from 3 days for mild organic problems such as upper airway infections or mild gastroenteritis to 21 days for more complicated conditions such as persisting lower respiratory tract or urinary tract pathologies, further investigation of endocrinologic, neurologic or hematologic abnormalities. Studies have shown that the incidence of RTI is higher in children under the age of 5 and in males [8]. The mean ages of 123 postponed children were 3.6 ± 4.4 years for females (52.8%) and 3.4 ± 4.2 years for males (47.2%) in our study. We found a positive correlation between the age of children to be operated on and the surgical postponement rate. However, we couldn't find statisti-

cally significant relationship between the gender and the postponement. The most two common medical reasons of the postponement in our study were lower (asthma, bronchitis, pneumonia, croup, suspicion of various pulmonary interstitial diseases like tuberculosis) and upper (rhinorrhea, nasal congestion, sneezing, sore throat, low grade fever) respiratory tract pathologies (53.7% and 15.4% respectively). Malvia et al performed a study with 713 children scheduled for cardiac surgery and found a positive correlation between the presence of respiratory tract infections (RTI) and postoperative respiratory complications as laryngospasm, bronchospasm, reintubation, pulmonary atelectasis and pneumonia [9,10]. They also found that children with preoperative RTI stayed longer in the post-operative intensive care unit than those with no infection [11,12]. As a conclusion, advance evaluation and limitation of the medical problems of infants and children increases the quality and efficiency of the surgical process. However, as specialists we should develop some strategies to limit the postponement rates without neglecting the surgical safety. Such approach is crucial to facilitate the perioperative rational planning and management of the scheduled operations.

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