

# Perioperative aspirin recommendations in children with fenestrated Fontan undergoing adenotonsillectomy

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## ABSTRACT

**Objective:** Pediatric patients who have undergone the Fontan procedure are often on a long term aspirin regimen which can complicate perioperative management. In high risk procedures such as adenotonsillectomy, hemorrhage can be a significant complication and aspirin use may increase the risk. We report the case of a patient with Fontan palliation who underwent adenotonsillectomy and presented with postoperative hemorrhage. We also review current literature on the topic of perioperative management of aspirin.

**Methods:** PubMed was searched for guidelines, case reports, and reviews on pediatric Fontan patients, adenotonsillectomy, and perioperative aspirin cessation.

**Results:** Current literature lacks a consensus on perioperative management of aspirin for patients on a long term aspirin regimen. Pediatric patients who have undergone the Fontan procedure are at an increased risk of thrombosis which suggests that aspirin should be continued perioperatively, except during high-risk procedures where there is increased risk of hemorrhage. Hemorrhage is a significant but uncommon complication of adenotonsillectomy; however, chances of hemorrhage do not appear to be increased in high-risk patients with comorbid conditions.

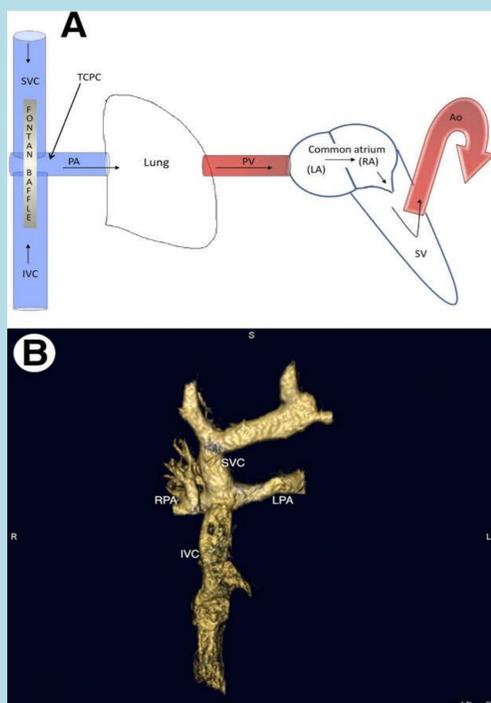
**Conclusion:** Current literature does not offer guidance regarding the ideal perioperative management of aspirin for patients with aspirin dependent cardiac conditions, such as those status post-Fontan repair. There is a need for evidence-based protocol on how to manage aspirin intake in the perioperative period for Fontan patients. Retrospective evaluation of current management and prospective protocols should be studied to aid in the management of this growing population.

## INTRODUCTION

- Patients that have undergone the Fontan procedure are at an increased risk of thromboembolism which necessitates anticoagulant administration indefinitely.
- The increased risk is often attributed to quantitative abnormalities in procoagulant and anticoagulant proteins, low flow, arrhythmia and venous stasis.<sup>6</sup>
- The delicate balance between these factors makes it difficult for surgeons to assess how perioperative aspirin cessation will affect Fontan patients following a procedure.

## CASE DESCRIPTION

- A 5-year old female with a history of Trisomy 21, and an unbalanced AV canal with hypoplastic right ventricle status post-bidirectional Glenn followed 2 years later by a fenestrated Fontan, presented with severe obstructive sleep apnea. Her obstructive apnea hypoxemia index was 62 events/hour with an oxygen nadir of 62% and noted hypercapnia.
- Adenotonsillectomy was recommended.



**Figure 1.** Fontan Anatomy. (A) Systemic venous blood enters the pulmonary circulation through an anastomosis between the superior and inferior vena cava and the pulmonary artery. Blood bypasses the right atrium, gets oxygenated in the lung, enters the pulmonary venous system, and returns to the left atrium. Atrial blood enters the single systemic ventricle before being ejected into the systemic circulation. (B) Cardiac MRI of total cavopulmonary anastomosis. Systemic venous blood returns directly to the lungs without ventricular assistance.<sup>4</sup>

## PERIOPERATIVE MANAGEMENT

- Since the patient's Fontan repair surgery, she was being managed on aspirin (81 mg per day). This began approximately one year prior to her adenotonsillectomy.
- Perioperative consideration for cessation of aspirin was considered to balance risk of post-tonsillectomy hemorrhage and cardiac risk.
- Aspirin was held 3 days before and 3 days after her adenotonsillectomy.
- She underwent uncomplicated complete adenotonsillectomy using monopolar cautery and was discharged to home on postoperative day 2 with CPAP of 4 cmH<sub>2</sub>O with a wisp mask.

## POSTOPERATIVE MANAGEMENT

- Management included Tylenol 10 mg/kg per dose every 6 hours in addition to ibuprofen 5 mg/kg per dose every 6 hrs.
- Post-Op Day 12: the patient presented with post-tonsillar hemorrhage that stopped spontaneously upon arrival to the ED.
- She had been off Motrin for over 48 hours and pain was being managed with once daily Tylenol. She had resumed her aspirin regimen (81 mg daily).
- Her hemoglobin dropped from 13.8 g/dL preoperatively to 11.5 g/dL at the time of presentation and her hematocrit decreased from 39.4% to 34.4%.
- She required no surgical intervention and was observed for 23 hours without any further bleeding.

## LITERATURE REVIEW

- Current guidelines do not recommend aspirin use in children following surgery.<sup>8</sup> Consequently, literature regarding aspirin and bleeding complications following adenotonsillectomy is outdated and sparse.
- The risk of hemorrhage increases in high risk procedures such as adenotonsillectomy.<sup>15</sup> Over 30% of Fontan patients experienced complications after non-cardiac surgery, with hemorrhage being the most common complication.<sup>4</sup>
- There is significant debate about whether the risk of hemorrhage from aspirin is more significant than its cardioprotective benefits in patients on a long-term aspirin regimen undergoing non-cardiac surgery.
- Criteria such as the kinetics of platelet recovery, stratifying surgical procedures according to risk of hemorrhage, and evaluating bleeding risk versus bleeding severity have been used to guide recommendations but there is little consensus.<sup>2,3,4,10,11,16</sup>
- When surveying otolaryngologists about their practices regarding perioperative management of antiplatelet drugs, 45% stated that they had no relevant departmental protocol and 86% welcomed more guidance on the topic.<sup>13</sup>

## DISCUSSION

- Although this case represents a likely timeline for idiopathic post-tonsillectomy hemorrhage independent of medication management, it brings into consideration that there is a lack of evidence in the perioperative care of Fontan patients to give recommendations for cessation of aspirin surrounding high risk procedures such as adenotonsillectomy.
- A literature review was completed assessing the use of aspirin in Fontan patients in addition to patients who underwent adenotonsillectomy with a goal of developing an evidence-based protocol for similar patients in the future.

## CONCLUSION

- The population of pediatric patients on a long-term aspirin regimen for cardiac conditions such as the Fontan repair is growing.
- Perioperative management of aspirin use in this population is crucial to balance the risk of hemorrhage versus thromboembolic events.
- Current literature lacks evidence-based protocol regarding the timeline of aspirin cessation in the perioperative care of Fontan patients.
- Retrospective study of Fontan patients who have undergone surgery will aid in the development of updated guidelines for surgeons and others involved in caring for similar patients in the future.

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