Evaluation Of Cardiothoracic Surgical Patients Experiencing Postponement Due To Caries

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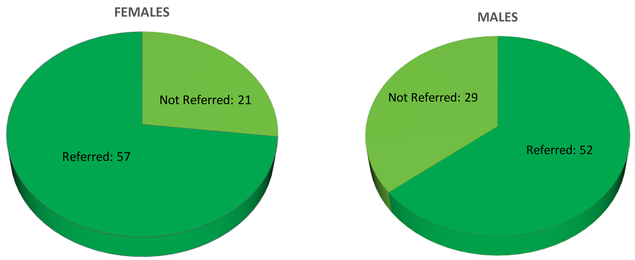
OBJECTIVE

The study aims to determine if patients that have established Children's Healthcare of Atlanta Children's Pediatric Dentistry as their dental home prior to recommendation of cardiothoracic (CT) surgery are less likely to have untreated dental caries or dental treatment needs that must be addressed prior to cardiothoracic surgery than patients referred to Children's Pediatric Dentistry because of their need for CT surgery.

BACKGROUND

The prevalence of total and untreated dental caries in primary or permanent teeth among youth aged 2–19 years was 45.8% and 13.0%, respectively, for 2015-2016.[1] Treating dental caries in pediatric patients requires consideration of the health status, the amount of treatment needed, and behavior guidance.

The American Academy of Pediatric Dentistry's Caries Risk Assessment tool categorizes patients with special healthcare needs (SHCN) as at least moderate risk, although other factors may increase risk. Dental caries in this population is of concern because patients with cardiovascular disease (CVD) tend to require multiple cardiothoracic surgical procedures. Infective endocarditis (IE) is a serious microbial infection of the heart valves or endocardium in proximity to congenital or acquired cardiac defects. Subacute IE is caused by viridians streptococci, a microorganism frequently found in the flora of the oral cavity.[2] If any pharmacological and/or behavior guidance is indicated for these patients, it should be managed by pediatric cardiac anesthesia. This can pose an obstacle for patients because one of the few pediatric cardiac anesthesia teams in the state of Georgia is located at Children's: Egleston. Board certified pediatric dentists with hospital privileges at Egleston have the best access to this team. The CVD patients must be referred to Children's Pediatric Dentistry by the cardiothoracic surgery team or their private practice dentist for management of dental caries. Dental caries must be treated within 3 or 4 weeks of planned surgery to allow for healing and the return of normal oral flora.[2] Children's cardiothoracic surgeons require patients to receive a dental evaluation and have dental treatment completed prior to CT surgery. Barriers that these patients may encounter include limited treatment options due to behavior and/or medical history, dental insurance approval and scheduling of treatment, and access to care by a provider that is competent in managing patients with SHCN.



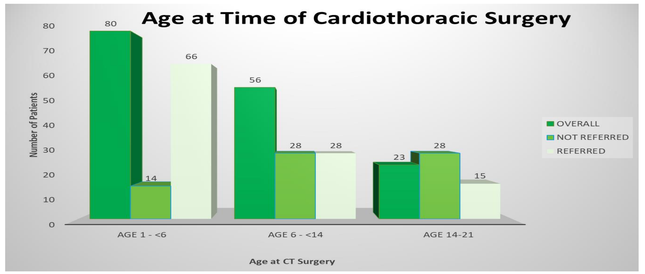
Total Referred: 109 Total Not Referred: 50

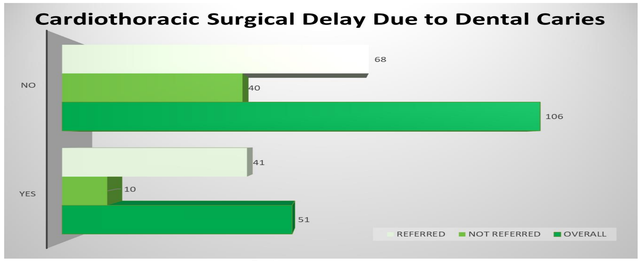
METHODS

- A review of activity reports was completed in Dentrix, an electronic dental record system, of patients in the pediatric dentistry clinic at Children's Healthcare of Atlanta that required a dental consult prior to cardiothoracic surgery during the 47-month period from January 1, 2020 through November 3, 2023.
- Patients categorized as not referred established Children's Pediatric Dentistry as the dental home with at least one comprehensive examination and/or recall appointment prior to requiring a dental consult for a recommended CT surgery.
- Patients categorized as referred did not establish Children's Pediatric Dentistry as the dental home prior to requiring a dental consult for recommended CT surgery. These patients were referred to Children's Pediatric Dentistry because of the recommended CT surgery.
- A review of the patients was also completed in EPIC, an electronic health record system.
- A Pearson's Chi-Squared Test and Wilcoxon Rank Sum Test were run to determine statistical significance.

Inclusion Criteria
1. Pediatric patients 1-21 years old
2. Confirmed CVD that required a dental consult prior to CT surgery
3. Patients of record with Children's Pediatric Dentistry that have pending CT surgery
4. Patients referred to Children's Pediatric Dentistry due to pending CT surgery

Exclusion Criteria
1. Patients that received a Children's Pediatric Dentistry consult prior to CT surgery but were delayed due to reasons unrelated to dental caries. (ex. respiratory illnesses, inadequate ICU beds)
2. Patients that have not been recommended for CT surgery





References upon request

RESULTS

A report from Dentrix indicated the total number of dental consults completed for cardiothoracic surgery was 168 in the pediatric dentistry clinic at Children's Healthcare of Atlanta. A total of 159 dental consults met inclusion criteria. Results were used to compare referred versus not referred patients based on age, sex, and length of delay due to dental caries.

There was no significant difference between males (51%) or females (49%).

Patients that were referred experienced more cardiothoracic surgical delay that was statistically significant when compared to those who were not referred (38% vs 20%, p=0.027). Referred patients with untreated dental caries experienced longer lengths of delay than patients that were not referred (p=0.033).

Risk factors that contribute to CT surgery delay include untreated dental caries, new patient referrals for cardiac consults, and age. In the univariable model, referred patients with untreated dental caries were 2.41 times more likely to experience a CT surgical delay (p=0.030). There was no statistical difference between age and CT surgical delay. In the multivariable model, the main risk factor of interest is newly referred patients for cardiac consult, our primary exposure. After adjusting for age group, those who were referred were 2.53 times more likely to experience a cardiac surgery delay due to dental caries (p=0.031).

Univariable and Multivariable Odds Ratio for Potential Risk Factors for Delayed Cardiothoracic Surgery

Characteristic	Univariable OR (95% CI) [1]	P-Value	Multivariable OR (95% CI)	P-Value
Referred				
Yes	2.41 (1.12, 5.57)	0.030	2.53 (1.12, 6.10)	0.031
No	Reference		Reference	
Age at Surgery				
1-<6 years	1.94 (0.69, 6.37)	0.235	1.71 (0.59, 5.68)	0.345
6-<14 years	1.71 (0.57, 5.81)	0.358	2.00 (0.65, 6.99)	0.246
14-21 years	Reference		Reference	

[1] OR = Odds Ratio; CI Confidence Interval

CONCLUSION

- Newly referred patients are 2.5 times more likely to experience cardiothoracic surgical delay due to dental caries, regardless of their age.
- Newly referred patients will experience longer cardiothoracic surgical delay than patients of record when untreated dental caries are identified.
- Improvement efforts should be directed at early screening, establishing a dental home with a pediatric dentist, anticipatory guidance, and caries prevention.
- Recommendation of professional organizations (Amer Acad of Pediatrics, Centers for Disease Control and Prev, Amer Acad of Ped Dent, Amer Dental Assoc and others) for establishment of a dental home no later than 12 months should be prioritized.
- Efforts to improve communication between the dental providers, the cardiac providers, and the parents to address dental caries as early as possible is necessary.
- Age and psychological developmental stage must be considered when surgical intervention of dental caries is indicated.