

Incidence of Autism Spectrum Disorder in Patients Requiring Dental Treatment Under General Anesthesia: A Retrospective Study

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INTRODUCTION

Autism spectrum disorder (ASD) is a neurological and developmental disorder that affects social interaction, learning, and behavior. Although autism can be diagnosed at any age before adulthood, it is described as a "developmental disorder" because symptoms usually appear in the first 2 years of life. Symptoms may include decreased capability for social interactions and communication, as well as certain repetitive behaviors (Jaber). ASD can be further categorized into autism, pervasive developmental disorder and Asperger syndrome (Loo et al).

Patients with ASD may have a harder time cooperating for dental treatment due to social, behavioral, communicative as well as intellectual impairment (Jaber). Studies have shown that children with ASD may have a higher prevalence of incomplete dental treatment and, therefore, a higher rate of dental caries, and poor oral hygiene (Jaber). Furthermore, some studies have shown a higher prevalence of general anesthesia use for patients with ASD (Loo et al). However, a direct correlation between patients with ASD and the need for general anesthesia has not been determined.

To investigate a possible correlation, the age factor must be considered. Patients in this study were divided into two groups using Piaget's cognitive development theory: 2-6 years old (the pre-operational stage; when children use their language very literally and tend to be more egocentric), and 7-16 years old (encompasses the concrete operational and formal operational stages; when children think more logically and abstractly). The purpose of this study is to evaluate the hypothesis that children with autism spectrum disorder are more likely to require the need for complete oral rehabilitation (COR) under general anesthesia (GA) for dental treatment.

MATERIALS & METHODS

Multiple logistic regression were used to explore whether there was a relationship between ASD and the use of GA. The data in this case-control study was obtained by reviewing records for 135 patients who needed GA and 104 patients who did not. Figure 1 and Figure 2 show further breakdown of the study's patient population. Two-sided $p < 0.05$ was considered statistically significant. SAS 9.4 (SAS Institute Inc, Cary, NC) was used for the data analysis.

The inclusion criteria were patients 2-16 years old. The exclusion criteria were patients not requiring dental work due to caries and only requiring surgical procedures (such as extraction of mesiodens' or supernumerary teeth), that cannot be completed in clinic setting due to age or complexity. The medical history of patients in this study were those with ASD for the study group and no diagnosis of ASD for the control group. The encounter was COR under GA.

DISCUSSION

This study aimed to investigate the hypothesis that there is a significant association between a diagnosis of ASD and the need for COR under GA. According to the results, a lack of association in the younger age group versus a significant association in the older age group between an ASD diagnosis and need for GA was seen. This can be explained by the fact that younger patients are less able to cooperate for dental treatment and more likely to need advanced behavior management techniques regardless of an ASD diagnosis. Utilization of protective stabilization therapeutic device is an advanced behavior technique that is frequently used for younger patients as well to complete emergency care, and at time avoiding the need to complete treatment under GA. As patients age and are more capable of cooperating, patients with ASD are more likely to need advanced behavior management than those without ASD.

Additionally, the need for extraction had a high association with the need for GA in both age groups which could be due to increased caries risk, dental pain, and possible previous extraction experience. Gender was not found to be a significant factor in either age group.

Overall, not finding an association between ASD and need for GA does not prove that an association does not exist. It may mean that evidence was not found for it for it in the data. However, it is possible that an association with a younger age group does exist, and a more comprehensive study is needed to detect it.

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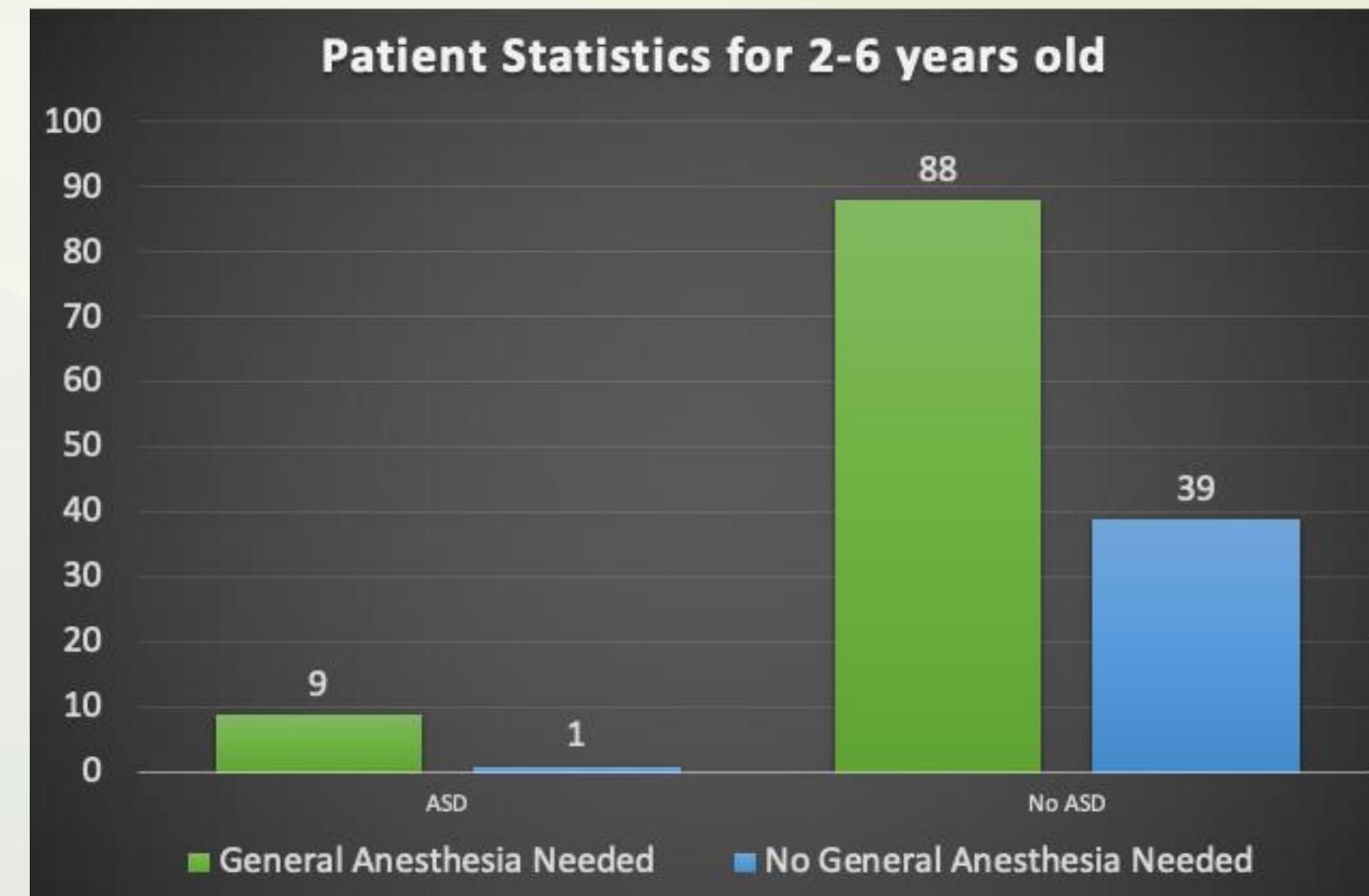


Figure 1: Patient statistics for 2–6-year-old participants in the study

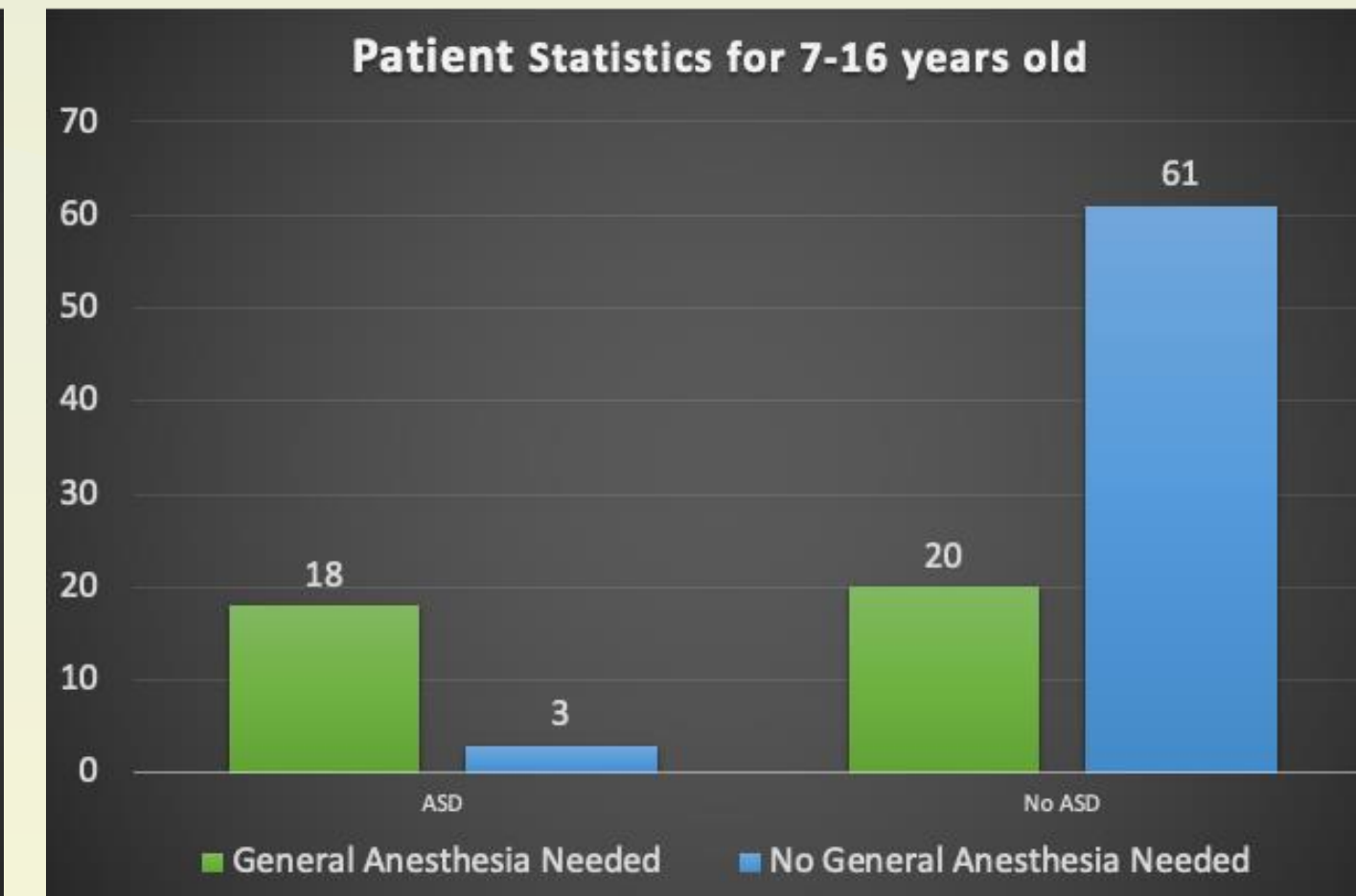


Figure 2: Patient statistics for 7–16-year-old participants in the study

RESULTS

Age group 2-6 years, n=137				
Effect	Odds Ratio	95% Confidence Interval Limits	p-value	
Autism (Yes versus No)	3.834	0.412 35.661	0.2376	
Extractions needed (Yes versus No)	4.256	1.785 10.146	0.0011	
Gender (Male versus Female)	0.810	0.362 1.812	0.6083	
Age (in years)	0.606	0.420 0.874	0.0073	

Table 1: Results for 2-6-year-old participants in the study. Total 137.

Age group 7-16 years, n=102				
Effect	Odds Ratio	95% Confidence Interval Limits	p-value	
Autism (Yes versus No)	15.147	3.383 67.824	0.0004	
Extractions needed (Yes versus No)	3.624	1.194 10.999	0.0230	
Gender (Male versus Female)	1.906	0.691 5.252	0.2126	
Age (in years)	0.860	0.683 1.082	0.1973	

Table 2: Results for 7-16-year-old participants in the study. Total 102.

The data in this case-control study was obtained by reviewing the records for 135 patients who required GA and 104 patients who did not. Only visits requiring restorative and oral surgery treatment due to dental caries were used. Overall, there were 4 (3.84%) ASD patients among the 104 participants who did not need GA and 27 (20%) ASD patients among the 135 participants who did need GA. Data was analyzed separately for age group 2-6 years (n=137) and 7-16 years (n=102).

Results for ages 2-6 (Refer to Table 1)

There was 1(2.50%) ASD patient among the 40 patients who did not need GA and 9(9.28%) among the 97 patients when GA was needed. In this younger age group, it was found that extraction (OR=4.256, 95% CI 1.785-10.146, $p=0.0011$) was associated with more than 4 times higher odds of needing GA, compared to patients for whom it was not required. Older age (OR=0.606, 95% CI 0.420-0.874, $p=0.0073$) was associated with reduced odds of GA (please see table above). ASD was not significantly associated with the use of GA (OR=3.834, 95% CI 0.412-35.661, $p=0.2376$). The comparison was also adjusted for gender, which was not significant.

Results for ages 7-16 (Refer to Table 2)

There were 3(4.69%) ASD patients among the 64 patients who did not need GA and 18(47.37%) among the 38 patients when GA was needed. In this older age group, ASD (OR=15.147, 95% CI 3.383-67.824, $p=0.0004$) was associated with more than 15 times higher odds of GA, compared to non-autistic children. As in the younger age group, extraction (OR=3.624, 95% CI 1.194-10.999, $p=0.0230$) was associated with more than 3 times higher odds of needing GA, compared to patients for whom it was not required. Age and gender were not found to be significant predictors in this age group.

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