

Does high body mass index influence resource utilization in children undergoing adeno-tonsillectomy?

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Introduction: Adeno-tonsillectomy is one of the most common major surgical procedures performed in children.¹ Childhood obesity is highly prevalent in America. Many obese children also suffer from obstructive sleep apnea, an important indication for adeno-tonsillectomy. Adult-derived data suggests a positive association between obesity and high health-care resource utilization.² There is very little data on the role of obesity on the health care cost following a surgical procedure in children. This study describes the impact of high body mass index on hospital cost in children undergoing adeno-tonsillectomy.

Methods: A retrospective cohort analysis of children aged <18yr undergoing tonsillectomy between January 1 2000 and January 1 2005. Using directly measured height and weight, we computed body mass index BMI on all patients and classified them as normal weight (BMI < 85th percentile), overweight (BMI > 85th and < 95th percentile), or obese (BMI ≥95th percentile) according to age and gender-specific reference growth charts from the National Center for Health Statistics (NCHS)/Centers for Disease Control and Prevention (CDC). Main outcome measures were diagnosis of obesity, length of stay (LOS), total hospital charges and charge per day. Total cost and charges data were obtained from the hospital's data warehouse.

Results: A total of 1226 children (55.1% males and 44.8% females) underwent adeno-tonsillectomy during the study period. Children aged <5yr formed 49.2%, while ages 6-12 formed 39.5% and adolescents were 11.3%. The overall prevalence of overweight and obese was 10.2%. Overweight and obese children had a higher prevalence of hypertension, diabetes and bronchial asthma ($p < 0.001$). Most (76.6%) children were discharged within 24hr. Obese and overweight children were more likely to be admitted than normal weight children ($\chi^2 = 26.3, p < 0.001$). Among those admitted, BMI showed a positive correlation with LOS ($r = 0.20, p < 0.001$). The total charge for tonsillectomy was \$3877.4±1724.7. Obese patients had significantly higher total hospital charge than their healthy weight counterparts. Additionally, obese and overweight children were more likely to have higher anesthesia charge ($p = 0.04$), laboratory charge ($p = 0.05$) and pharmacy charges ($p = 0.03$). There was no significant difference in the PACU charges ($p = 0.721$) routine nursing charges.

Conclusion: To date, no previous study has examined the impact of high BMI in children on peri-operative health care cost. We have shown that overweight and obese children undergoing adeno-tonsillectomy have significantly higher pharmacy and PACU charges than their normal weight peers although there was no significant difference in the total hospital charge.

Table . Mean hospital charges by BMI categories

Charges	Normal weight Mean \$(SD)	Overweight Mean \$(SD)	Obese Mean \$(SD)
Total hospital charge ^a	4023.9(2494.8)	4468.8(3400.9)	5031.9(2559.4)
Anesthesia charge ^a	980.7(109.8)	1016.3(211.3)	1024.2(142.9)
OR charge	1817.5(1129.2)	1975.8(1395.2)	1949.7(829.4)
PACU charge	795.9(208.3)	827.5(217.7)	847.8(302.4)
Pharmacy charge ^a	234.4(23.7)	256.4(26.0)	310.1(25.8)
Laboratory charge ^a	144.2(36.9)	148.7(33.0)	299.4(53.4)
Nursing charge	1338.9(966.7)	1464.8(1364.6)	1444.4(997.5)

^a p value < 0.001 for obese vs. normal BMI and < 0.01 for overweight vs. normal BMI.

References:

1. Thorpe KE, Florence CS, Howard DH, Joski P. The impact of obesity on rising medical spending. *Health Aff (Millwood)*. 2004(suppl Web exclusives):W4-480-6.
2. Rosenfeld RM, Green RP. Tonsillectomy and adenoidectomy: changing trends. *Ann Otol Rhinol Laryngol*. 1990;99: 187-191.