Exercise Stress Testing and Cardiac Outcomes in Pediatric Patients Undergoing Bariatric Surgery

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BACKGROUND

- Bariatric surgery at programs with multidisciplinary subspecialty expertise is an effective treatment for severely obese pediatric patients
- Exercise stress testing (EST) is a common component of preoperative risk assessment for bariatric surgery in the adult population due to the increased incidence of coronary artery disease in obese adults
- We hypothesize preoperative EST does not identify significant cardiac risk in an adolescent bariatric populations

OBJECTIVE

- Review EST results and perioperative cardiac outcomes and perform cost analysis to assess the utility and cost of EST for cardiac risk assessment in pediatric patients undergoing bariatric surgery

METHODS

- Retrospective chart review performed from March 2020 to February 2022 at CT Children's evaluating obese pediatric patients undergoing bariatric surgery
- Data collection included patient demographics, EST categorical variables, and adverse cardiac outcomes from the perioperative period
- Cost analysis from CPT codes 93017 and 93018 performed

RESULTS

- Fifty-two participants underwent simple cardiac stress test according to the Bruce Protocol prior to surgery (Table 1)
- Average age of patients was 16.7 years, all were cisgender with 84.6% female
- The most represented race/ethnicity within the study group was Hispanic (42.3%), of which three participants also identified as black (Table 2)
- Average preoperative BMI was 47.8 kg/m^2 (Figure 1)
- EST data demonstrated an average work level achieved of 8.1 METS; average exercise time was 6 minutes 19 seconds

RESULTS

- Exaggerated heart rate response to exercise, consistent with deconditioning, was observed in 22/52 (42.3%) participants; 41/52 (78.8%) subjects produced a maximal effort (Figure 2)
- Blood pressure response to exercise was normal in 100.0% of patients, 98.1% had no ectopic beats, and 100.0% had no runs of pathologic arrhythmia; none had ST changes (Figure 2)
- No cardiac adverse events appreciated in the operative or postoperative period
- Elimination of universal EST prior to bariatric surgery would impart an estimated cost savings of $26,728/year given cost per EST (Table 3)

CONCLUSIONS

- Exercise stress testing did not demonstrate clinically significant abnormalities in obese pediatric patients prior to bariatric surgery
- Excluding deconditioning, all EST results were normal
- No cardiac adverse events occurred in the operative or postoperative period following bariatric surgery
- Our findings suggest that due to the lower risk of coronary artery disease in the pediatric population, preoperative EST may be reserved for select high risk patients.

FUTURE DIRECTIONS

- Devise a new algorithm for cardiac clearance based on clinical history and risk factors to optimize outcomes and resource utilization
- Determine clinical efficacy of this new algorithm compared to standard of care

LIMITATIONS

- Retrospective chart review study

Stage	Duration (mins)	Speed (MPH)	Grade (%)
1	3	1.7	10
2	3	2.5	12
3	3	3.4	14
4	3	4.2	16
5	3	5	18
6	3	5.5	20
7	3	6	22

Table 1. Bruce Protocol[1]

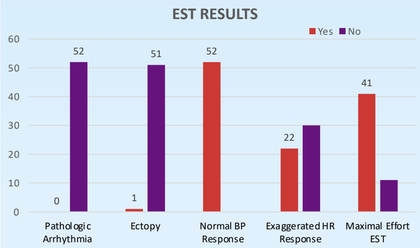

Figure 2. Results from Exercise Stress Testing

Basic Demographics	n (%)
Number of Participants	52
Mean Age	16.7 years
Sex - Male	8 (15.4%)
Gender - Male	8 (15.4%)
Race	
White	13 (25.0%)
Black/African-American	19 (36.5%)
American-Indian or Alaskan Native	0 (0.0%)
Asian	0 (0.0%)
Native Hawaiian or Pacific Islander	0 (0.0%)
Other	20 (38.5%)
Ethnicity - Hispanic/Latino	22 (42.3%)
Insurance Coverage	
Private	20 (38.5%)
Public	29 (55.8%)
None	2 (3.8%)

Table 2. Demographic Data

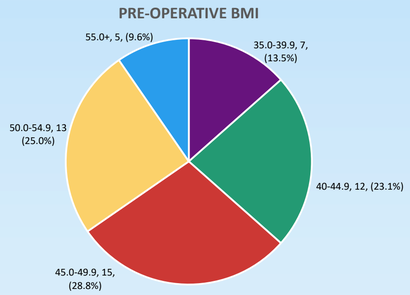

Figure 1. BMI prior to bariatric surgery

CPT	Price
93017	$ 967.00
93018	$ 61.00
Total	$ 1,028.00

Table 3. Cost analysis

REFERENCES

1. Bruce RA, Blackmon JR, Jones JW, et al. Exercise testing in adult normal subjects and cardiac patients. Pediatrics 1963;32:742-756.