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Impact of Definitive Surgery for Graves' Disease on Adolescent Health-Related Quality of Life and Psychosocial Functioning

Stephen Halada, B.S., Julia Baran, B.A., Tasleema Patel, B.A., Amber Isaza, B.A., Leanne Magee, Ph.D., and Andrew Bauer, M.D.

Introduction: Pediatric Graves' disease (GD) is associated with hyperthyroid symptoms broadly impacting psychosocial functioning. Total thyroidectomy (TT) is a definitive treatment option that replaces long-term antithyroid medication (ATD) for GD. While studies have examined health-

related quality of life (hrQOL) in adults, there are no data describing impacts of definitive surgery in pediatrics. In this prospective, longitudinal study, we explored the impact of definitive surgery on hrQOL and psychosocial functioning in adolescent patients with GD.

Methods: Patients 12-19 years old pursuing definitive surgery for GD and their parents were recruited to complete surveys before and at least six months following TT. Parents pre-operatively completed a demographic questionnaire, parent rating scale assessing perceived symptom severity, and motivations for pursuing TT questionnaire. Patients pre- and post-operatively completed the Pediatric Quality of Life Scales (PedsQL), Quality of Life Questionnaire for Patients with Thyroid Disease (ThyPRO), Perceived Stigmatization Questionnaire (PSQ), Body Esteem Scale for Adolescents and Adults (BESAA), and European Group on Graves' Orbitopathy GO Quality of Life Questionnaire (EUGOGO-QOL). Patients and parents post-operatively completed the Patient and Observer Scar Assessment Scale (POSAS) and a post-surgical satisfaction scale. Longitudinal paired scores were compared using Wilcoxon rank-sum test with Bonferroni-Holm correction. Survey subscore associations were assessed using Spearman tests with Benjamin-Hochberg correction. P-values < 0.10 for survey association analyses and all other p-values < 0.05 were considered statistically significant.

Results: Thirty-six patient/parent dyads completed baseline surveys, including 19 patient/parent dyads completing both pre- and post-TT surveys. Families reported that patients' GD and ATD significantly interfered with quality of life. Motivations for definitive surgery included ease of monitoring hypothyroidism as opposed to hyperthyroidism, access to a 'high-volume' surgeon, desire to reduce goiter symptoms, and opposition to radioactive medication. At baseline, patients reported high physical and cognitive GD symptomology via ThyPRO, specifically hyperthyroid symptoms, tiredness, anxiety, and emotional susceptibility. Psychosocial functioning via PedsQL, specifically in school settings, was depressed. Disease-specific hrQOL (ThyPRO) significantly improved following TT, with notable improvements in goiter ($p=0.002$), hyperthyroid symptoms ($p=0.002$), tiredness ($p=0.003$), and anxiety ($p=0.003$). Physical ($p=0.006$) and school-related functioning ($p=0.003$) improved post-TT (PedsQL), while variables captured by PSQ, BESAA, and EUGOGO-QOL were not significant pre- and post-TT. Reported GD-associated eye symptomology was minimal at baseline and further improved following surgery ($p=0.007$). ThyPRO and PedsQL subscores were significantly associated at baseline and change after surgery, suggesting interconnectedness between disease-specific hrQOL and psychosocial functioning. Patients and parents reported median recovery of two months and high satisfaction with the outcomes of definitive surgery, with minimal scar appearance concerns.

Conclusions: In the setting of a high-volume surgeon with low complication rates, definitive surgery for GD in pediatric populations has substantial, beneficial effects on disease-specific hrQOL and psychosocial functioning, with minimal adverse scar appearance complaints.

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