**PHILADELPHIA ACADEMY OF SURGERY**
**SUBMISSION FORM**

Name: Heather Wachtel

Email Address: heather.wachtel@uphs.upenn.edu

Phone Number: 215-519-8058

Institution: Hospital of the University of Pennsylvania, Dept. of General Surgery

Check: X Resident
☐ Fellow

# What can we learn from failed parathyroid operations?

Heather Wachtel, MD, Michael C. Wismer, BA, Edmund K. Bartlett, MD, Rachel R. Kelz, MD, Giorgos C. Karakousis, MD, Douglas L. Fraker, MD

Introduction: Surgical intervention is the only definitive cure for primary hyperparathyroidism (pHPT). We studied our large series of parathyroidectomies performed by an experienced surgeon to identify factors predictive of failed operative intervention.

Methods: We identified all patients who underwent parathyroidectomy for pHPT with intraoperative parathyroid hormone (IOPTH) monitoring by a single surgeon (2002-2012). Patients with recurrent hyperparathyroidism were excluded. Factors examined on retrospective chart review included patient demographics, preoperative serum calcium level, preoperative parathyroid hormone (PTH) level, prior thyroid surgery, MEN-1, preoperative localization by imaging, final pathology, and ectopic location. Primary outcome was cure, with intraoperative cure (IC) defined as ≥50% decrease of IOPTH and into normal range, and delayed cure (DC) defined as failure to meet IOPTH criteria, but normal calcium and appropriate PTH on postoperative follow-up. Univariate analysis was performed using Student's t-test and Fisher's exact test, as appropriate.

Results: 1875 consecutive patients met inclusion criteria; the cure rate was 98.5%. Cured patients were more likely to have preoperative localization by imaging (59.3 versus 27.6%, p=0.0009), and had lower preoperative calcium levels (10.9 versus 14.6 mg/dl, p<0.0001) than patients who failed operative intervention. Cured patients also had a higher proportion of single adenomas (81.6 versus 27.6%, p<0.0001), a lower rate of double adenomas (10.2 versus 24.1%, p=0.03), fewer triple adenomas (0.1 versus 3.4%, p=0.05), and a lower incidence of hyperplasia (8.1 versus 24.1%, p=0.01) than patients who were not cured. Of the 1846 patients who were successfully cured, 1790 (97.0%) had IC, while 56 (3.0%) had DC. Patients with DC were on average, older (62.3 versus 58.3 years old, p=0.03) and had higher preoperative PTH levels (311.9 versus 118.3 pg/ml, p<0.0001). DC patients had lower rates of single adenomas (69.6 versus 82.0%, p=0.03), and were more likely to have hyperplasia on final pathology (23.2 versus 7.6%, p=0.0003) than patients with IC.

Conclusion: Multi-glandular disease and prior thyroid surgery were correlated with increased rates of operative failure. A subset of patients who were not cured intraoperatively had DC on postoperative evaluation. We hypothesize that older patients may have slower metabolism of PTH and may not meet criteria for IOPTH, but may ultimately be cured. Positive imaging did not significantly increase cure rate and should not influence the decision to operate.