From “Horrid Butchery” to “Supreme Triumph”: The Birth of Modern Thyroid and Parathyroid Surgery

Wen T. Shen, MD MA
Endocrine Surgery Section
UCSF Department of Surgery
Introduction

• Thyroidectomy and parathyroidectomy are now routine, frequently outpatient procedures
• Easy to forget that they were once considered extremely challenging and even potentially deadly operations
• The advancements that led to safe thyroid and parathyroid surgery were among the most significant in the history of modern surgery
The history of goiter

• Goiter among the earliest described medical conditions
• Numerous medical and attempted surgical therapies throughout the history of medicine:
  – Seaweed
  – Sponges
  – Cauterization
  – Setons
  – Drainage
  – Shoestring ligation
Early attempts at thyroidectomy

• Before mid-19th Century, thyroid resection attempted by several European surgeons with typically disastrous results
  – Hemorrhage
  – Infection/Sepsis
• Overall mortality rate >40%
• Banned by French Academy of Medicine in 1850
Samuel Gross, 1866

• “No sensible man will... attempt to extirpate a goitrous thyroid gland. Every step he takes will be envisioned with difficulty, every stroke of his knife will be followed by a torrent of blood and lucky will it be for him if his victim lives long enough to enable him to finish his horrid butchery.”

Thomas Eakins, ‘The Gross Clinic’, 1875
Pitfalls of thyroidectomy

• Billroth: legendary surgeon (first esophagectomy, gastrectomy, laryngectomy)
• Not so fortunate with thyroid surgery...
  – 25% recurrent laryngeal nerve injury
  – 10.5% tracheotomy
  – Initial 40% mortality

Theodor Billroth (1829-1894)
Kocher’s contributions

• Initial mortality rate of 14.8%, down to 0.18%
• RLN injury rate less than 1%
• Principles that still hold true today:
  – Preserve the nerves
  – Preserve the parathyroid glands
  – Limit bleeding
  – Replace thyroid hormone appropriately
• Awarded Nobel Prize 1909

Theodor Kocher (1841-1917)
Halsted’s perspective - 1920

- “The extirpation of the thyroid gland typifies, perhaps better than any other operation, the supreme triumph of the surgeon’s art…”

William Halsted, MD (1852-1922)
The history of the parathyroid glands

- First identification of parathyroid glands in animal occurred in 1849
- Autopsy on Indian rhinoceros at London Zoo performed by famed anatomist Richard Owen

Sir Richard Owen, (1804-1892)
First description of parathyroid glands in humans

- Swedish medical student Ivar Sandstrom was the first to describe parathyroid glands in human cadaver studies in 1880
- Function of glands and their role in calcium homeostasis gradually elucidated over next several decades
First parathyroidectomy?

- Bland-Sutton, c.1917, operating on woman with airway obstruction: “I removed the rounded body, as big as a cherry, situated below the lower angle of the thyroid gland on the left side of the trachea. It had the microscopic features of a parathyroid”

- No evidence of parathyroid disease, no correlation with biochemical abnormalities

John Bland-Sutton, (1855-1936)
First parathyroidectomy*: Vienna, 1925

- 33 y.o. streetcar driver Albert Jahne diagnosed with primary hyperparathyroidism with resultant musculoskeletal effects
- Surgeon Felix Mandl performed bedside parathyroidectomy with excellent short-term results

Felix Mandl, (1892-1957)
First U.S. parathyroid operation: 1926

- Captain Charles Martell: rugged sailor, developed musculoskeletal complaints, lost many inches in height
- Diagnosed with primary hyperparathyroidism and treated at Massachusetts General Hospital
- Required 7 operations in total, finally found adenoma in mediastinum
From MGH to modern-day

• In the less than a century since first US parathyroidectomy, improvements in:
  – Biochemical testing
  – Radiologic localization
  – Operative techniques
  – Understanding of pathophysiology and natural history of the disease, as well as genetic syndromes
Conclusion

• While now routine, thyroidectomy and parathyroidectomy were once among the most challenging operations undertaken by surgeons

• Despite recent technologic advancements, same principles will always apply:
  – Be precise and meticulous in dissection
  – Understand relevant anatomy and pathophysiology of endocrine disease
  – Avoid injury to surrounding structures