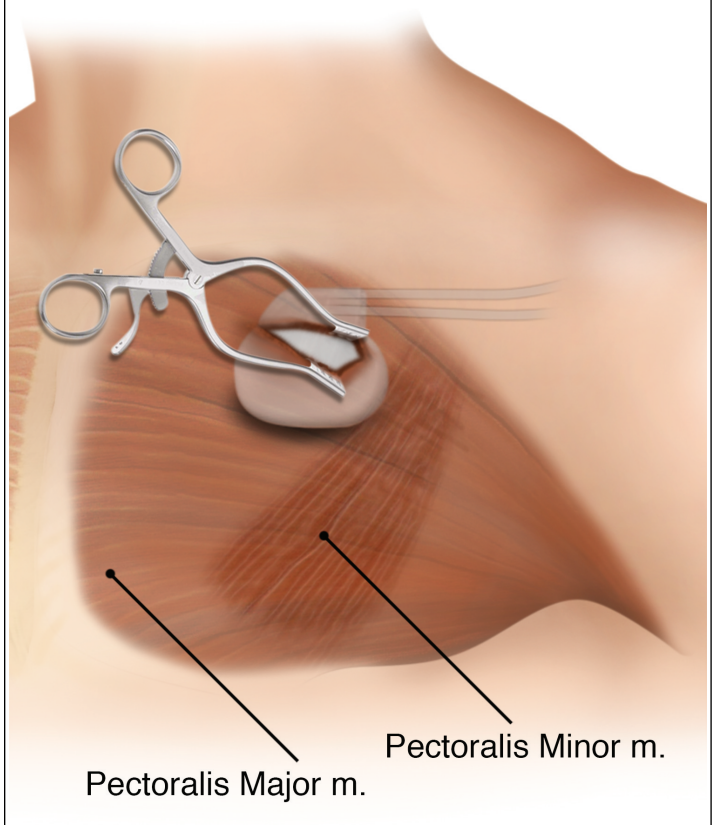
Subpectoral Implantation of Deep Brain Stimulator Internal Pulse Generators

Gabrielle A White-Dzuro; Wendell Bradley Lake MD; Joseph S. Neimat
Vanderbilt University Department of Neurosurgery

Introduction

- DBS is a beneficial therapy for Parkinson's Disease (PD), Essential Tremor (ET), and other disorders
- Greater demands are placed on neurosurgical practitioners to improve cosmetic results, patient comfort, and minimize complication rates
- Our center has increasingly employed subpectoral implantation of internal pulse generators (IPGs) to improve patient satisfaction and decrease complication rates

Subpecotral IPG Insertion



Methods

- 301 patients, 308 procedures
- Single surgeon, single institution
- Complications: infection, hematoma, painful device location and lead fracture
- Rates were compared for subcutaneously located and subpectorally located devices

Results

- 275 patients had subpectoral IPG implantation, 19 patients had subcutaneous implantation in the chest, 14 had subcutaneous implantation in the abdomen
- 6 IPG pocket infections: 2 subpectoral and 4 subcutaneous in the chest, 2 of the latter had associated erosions
- 2 patients had devices relocated from subpectoral pocket to subcutaneous in the abdomen due to patient discomfort
- 1 patient had their IPG removed due to discomfort and poor patient response to DBS
- 1 patient had their subcutaneous IPG slip into their breast implant pocket, requiring repositioning to the abdomen
- 2 patients suffered from pocket hematomas requiring evacuation, both had subpectoral implantation
- 2 patients had lead fracture occur, both had subcutaneous implantation in the chest

	Subpectoral	Abdominal Subcutaneous	Chest Subcutaneous
Number of times used	275	14	19
Surgical Site Infection	2 (0.7%)	0	4 (21%)
Hematoma	2 (0.7%)	0	0
Lead Fracture	0	2 (14%)	0
Patient Discomfort	2 (0.7%)	0	0
Other Complications	1 (0.4%)	0	1 (5%)

Table 1. Complications based on IPG Location

Patient Characteristic	N
Total Number of Patients (n)	301
Age (avg, SD)	62.0 (+/- 11.6)
Female (n, %)	134 (45%)
Disease (n, %)	
Parkinson's Disease	165 (55%)
Essential Tremor	98 (32%)
Other	38 (13%)
IPG Type (n, %)	
Activa PC	182 (59%)
Activa RC	8 (2.6%)
Activa SC	22 (7%)
Soletra	16 (5%)
Kinetra	76 (25%)
St Jude	3 (0.9%)
Libra	1 (0.3%)
IPG Location (n, %)	
Subpectoral	275 (89%)
Subcutaneous Chest	19 (6%)
Subcutaneous Abdomen	14 (5%)

Table 2. Patient Demographics

Conclusions

- Subpectoral implantation of DBS IPGs is a viable alternative that may offer a lower rate of infection and erosion
- The risk of post-surgical hemorrhage may be greater with subpectoral implantation.

References

1. Al-Bataineh, M., et al., Axillary subpectoral approach for pacemaker or defibrillator implantation in patients with ipsilateral prepectoral infection and limited venous access. J Interv Card Electrophysiol, 2010. 27(2): p. 137-42.
2. Fayman, M.S., L.A. Chait, and F. Orak, A subpectoral pocket in the management of a patient with impending extrusion of a pulse generator. Plast Reconstr Surg, 1986. 78(2): p. 182-5.
3. Manolis, A.S., et al., Pectoral cardioverter defibrillators: comparison of prepectoral and submuscular implantation techniques. Pacing Clin Electrophysiol, 1999. 22(3): p. 469-78.
4. Son, B.C., et al., Transaxillary subpectoral implantation of implantable pulse generator for deep brain stimulation. Neuromodulation, 2012. 15(3): p. 260-6; discussion 266.