THE USE OF 64 SLICE CT FOR PARATHYROID LOCALIZATION
David P DeMarino MD.
South Hills ENT, Clinical Assist. Prof., University of Pittsburgh

Abstract
To evaluate the ability of 64 slice CT to detect parathyroid adenomas. 64 slice CT is a new higher resolution, faster CT scanner than previously available. The scanner’s ability to image tiny structures with accuracy makes it ideal for searching for small parathyroid adenomas.

Methods and Materials
All scans were performed on a Toshiba Aquilion 64 slice CT scanner. The patients were scanned supine and images from the top of the maxillary sinuses through to the aortic arch were acquired without contrast, and then with contrast in both arterial and venous phases of enhancement. Axial, sagittal and coronal planes were reconstructed at 1mm thin slices. All scans were interpreted by a single Radiologist with 20 years experience in reading neck CT. The Radiologist was blinded to any other information in the patient’s workup, specifically, the results of any sestamibi scan done. Seven surgeons (6 ENT 1 General), from three different practice groups contributed all patients. Each surgeon reviewed the CT results prior to surgery. Operative data was gathered with regards to exact location of the parathyroid adenoma found and exact size of the adenoma using the localizing information from the CT scan. Of 31 cases reviewed, 2 patients had prior thyroid parathyroid surgeries.

Results
46 cases were scanned. Only 31 at the time of this presentation have had surgery.
30 of 31 cases were correct with CT alone (97%)  
18 of 31 cases with definitely positive sestamibi readings alone were correct (58%)  
4 of 31 cases with probably positive sestamibi readings were correct (13%)  
22 of 31 cases from both above types of positive sestamibi (71%)  
31 of 31 cases with CT and sestamibi combined were correct (100%)  
Of the 10 negative sestamibi, the CT found all off them

Introduction
Parathyroid localization studies have improved and currently depend on sestamibi nuclear medicine imaging. Ultrasound and CT have provided ancillary information but have not been as sensitive for detection or accurate. With 64 slice CT, the scanner can take 64, 0.5 mm thick images per second. This is so fast that motion is almost stopped and resolution is excellent. The scan slice is a pure isovoxel in size so that reconstruction in any imaging plane has the same high resolution as the original axial scan data. It was felt therefore that if careful interpretation of the images was performed, there is no reason a structure the size of a parathyroid adenoma should not be seen. The total scan time is only a few seconds and should be much more easily tolerated than the three hours necessary for sestamibi scans. Because the anatomy could be shown in any orientation with extreme detail, it would aid in mapping out the surgical approach.

Conclusions
The 64 slice CT is a useful modality for the workup of parathyroids. It was found to be very helpful to the surgeon who was able to preoperatively measure the distance of the adenoma from the cricoid, on the correct side so that a smaller and appropriately placed skin incision could be made. Additionally, the surgeon had preoperative knowledge of the structures the adenoma touched and how deep from the skin it was or even if it may be intrathyroidal. All of this information greatly reduced operating time in all of these cases. The patients better tolerated the much shorter exam time compared to sestamibi scans. The previously operated neck or difficult anatomy cases were greatly helped by the scans. Caution must be taken. Scan protocols must be adhered to and the exams must be interpreted by an experienced reader. Interpretation is time intensive. The surgeon must also take time to thoroughly review the scan ahead of the surgery in all planes imaged and make the appropriate measurements. This study raises the question as to whether or not CT can replace or at least be the first line test in the workup of parathyroid adenomas.

References