

Pre-operative localisation studies in primary hyperparathyroidism: concordance with surgical findings and histology

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Introduction

Successful minimally invasive parathyroidectomy for primary hyperparathyroidism depends on accuracy of pre-operative localisation studies

Ultrasound (US) and sestimibi (SM) scanning remain the imaging modalities of choice reserving MRI, CT and PET for patients who have not been cured by previous explorations or for whom other localization techniques are uninformative or discordant

The aim of this study was to review the accuracy of US and SM in the pre-operative localisation of parathyroid adenomas

Methods

We performed retrospective review of patients with a biochemical diagnosis of primary hyperparathyroidism and who subsequently had undergone parathyroidectomy from January 2011 to December 2011

We compared pre-operative imaging (ultrasound and ^{99m}Tc-sestamibi scintigraphy) to surgical and post op histological findings to look for any correlation

Other data recorded included patient demographics, pre-operative serum calcium and parathyroid hormone (PTH) concentrations, immediate post-operative calcium and 6 month follow up post op calcium

Sensitivity, specificity and positive predictive values were calculated from the above results

Results

Complete data was available for 47 (of 51 reviewed) patients. Baseline characteristics shown in Table 1.

Male: Female	12:35
Age (years)	64 (15-81)
Pre-op calcium (mmol/L)	2.85±0.17
Pre-op PTH (pg/ml)	126.0±113.0
Post-op calcium (mmol/L)	2.43±0.18
6 month post op calcium (mmol/L)	2.39±0.14

Table 1: Patient characteristics

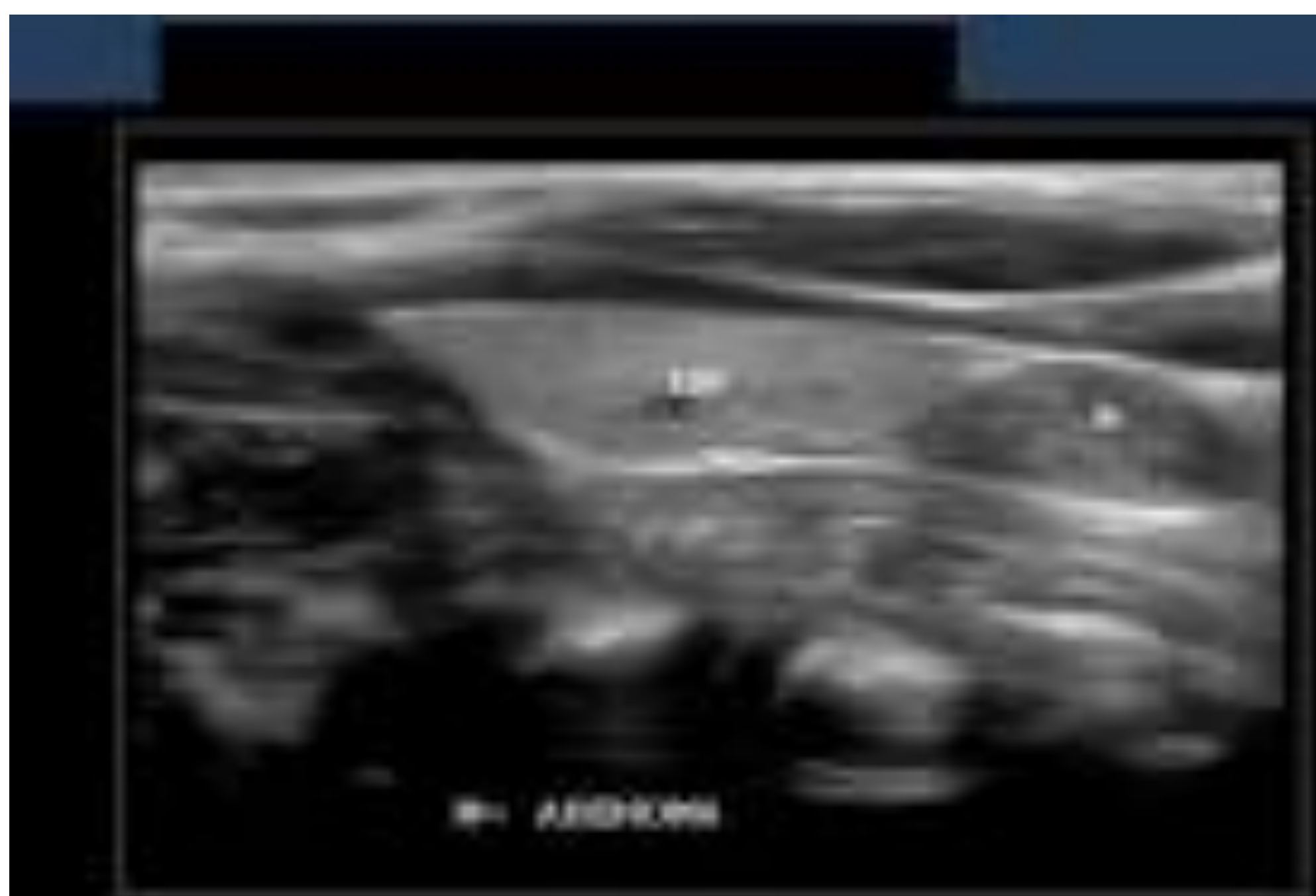


Figure 1: Parathyroid adenoma on US

US and SM scans were performed by the same radiologist. Each patient was discussed at Multidisciplinary Team Meeting. Parathyroid surgery was undertaken by one of two experienced Endocrine Surgeons

Thirty six patients had a solitary parathyroid adenoma, six had parathyroid hyperplasia, one had multiple adenomas and four had inconclusive histological findings

Ultrasound was positive in 29 of 36 (80.6%) adenomas with precise anatomical position found in 22 of the 29 giving a sensitivity, specificity and positive predictive value of 81, 64 and 88%, respectively (Figure 1; Table 2)

Pre-operative ^{99m}Tc-sestamibi scintigraphy correctly identified 21 of 36 (58.3%) adenomas with 58.3% sensitivity, 81.8% specificity and 91.3% positive predictive value. US findings correlated with SM in 20 patients and were 85% accurate giving sensitivity 81.2%, specificity 100% and positive predictive value 100% (Figure 2; Table 2)

	US	SM	US+SM
Sensitivity (%)	81	58	81
Specificity (%)	64	81	100
Positive Predictive Value (%)	88	91	100

Table 2: Specificity and sensitivity of US, SM and combined imaging

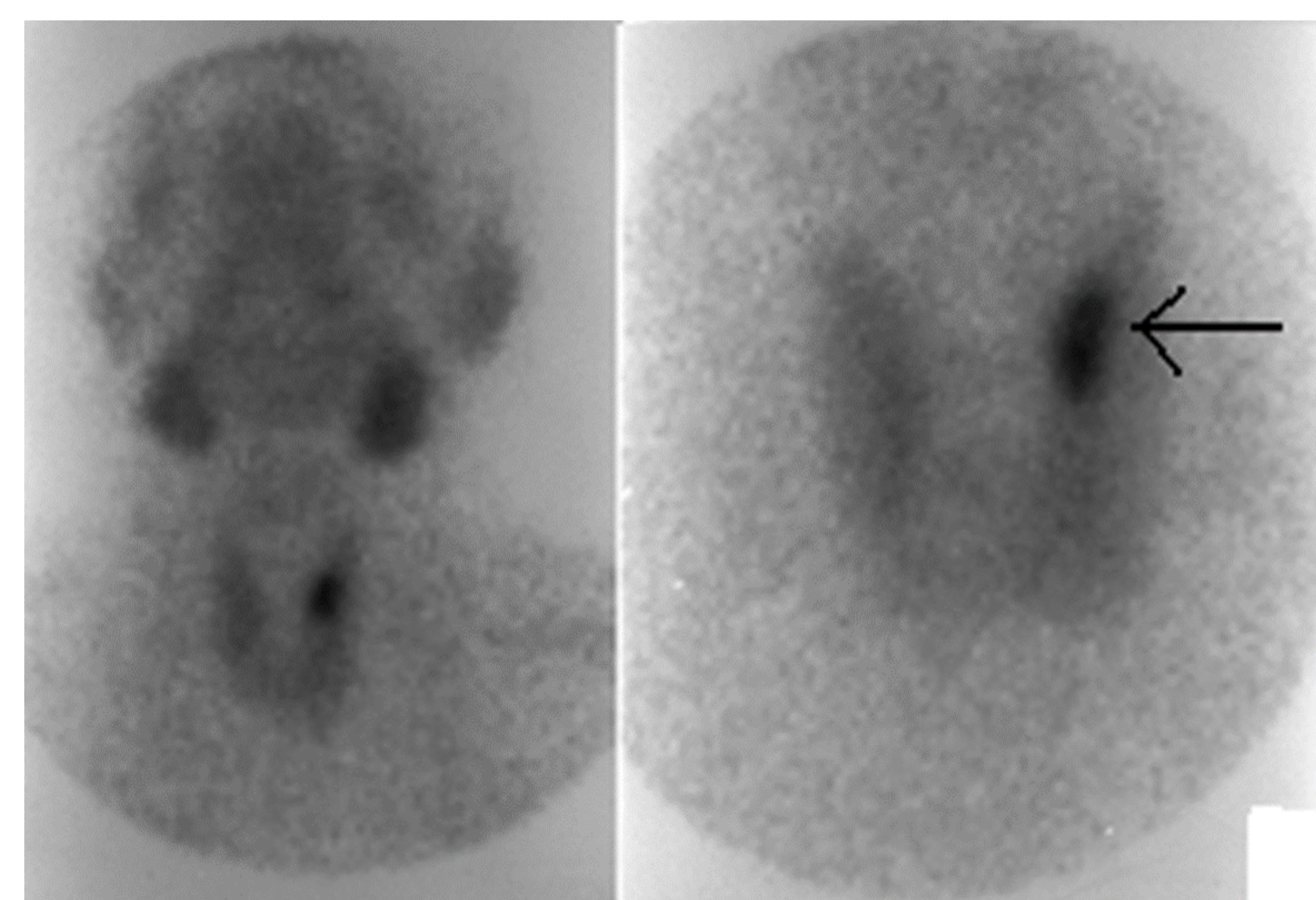


Figure 2: Parathyroid adenoma on SM

Discussion

Ultrasound and sestimibi scanning show good concordance with histology following parathyroid surgery and when combined provide accurate pre-operative localisation

They should remain the first line to guide minimally invasive parathyroidectomy while other techniques, such as CT and MRI, should be reserved for when results are discordant or for those who need re-exploration following failed surgery