

Setting up a parathyroid multidisciplinary team meeting: one year's experience, outcomes and learning points

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Abstract

Objective: A parathyroid multidisciplinary team meeting was set up at East Sussex Healthcare Trust, from November 2014 to November 2015, in order to improve and streamline services for patients with parathyroid pathology.

Methods: Data were collected on all new referrals for hyperparathyroidism, and on the outcomes for each patient discussed at the meeting, including the number of operations and management outcomes. A survey was sent out to the members of the multidisciplinary team meeting to determine their perception of its effectiveness.

Results: Seventy-nine new referrals were discussed throughout the year; 43 per cent were recommended for surgery, 41 per cent had a trial of conservative or medical management before re-discussion, and 16 per cent required further imaging. Ninety-two per cent of patients underwent an ultrasound, single-photon emission computed tomography/computed tomography or nuclear medicine (sestamibi) scan prior to the meeting. All ultrasound scans were performed by a consultant radiologist.

Conclusion: The multidisciplinary team meeting has been successful, with perceived benefits for patients, improved imaging evaluation and efficiency of referral pathways, leading to more appropriate patient management.

Key words: Parathyroid Glands; Hyperparathyroidism; Multidisciplinary Team

Introduction

Primary hyperparathyroidism secondary to a parathyroid adenoma is the most common reason for performing parathyroidectomy.¹ It is an effective and definitive treatment, which can be carried out via a minimally invasive approach, with manageable complications.² Furthermore, recent advances in imaging technology have made pre-operative localisation of abnormal parathyroid glands potentially much more accurate, although there remains considerable variability in approaches to imaging. There is also considerable variation in the location of the parathyroid glands within the population, which makes surgical identification and resection of adenomata challenging.³ It is vital to have reliable and accurate imaging to allow planning for a minimally invasive parathyroidectomy and reduce the complication rate.⁴

The concept of a multidisciplinary team (MDT) approach is well accepted, and is considered good practice for the management of complex and chronic conditions.^{5,6} It was initially started for the management of cancer, but is now widespread throughout medicine and surgery.⁵ The MDT involves both clinicians and

allied healthcare professionals, and MDT meetings provide an effective clinical forum for specialists to formulate management plans for complex cases. The MDT meeting will make a recommendation to the primary clinician and the final decision should be made following discussion with the patient.⁵ The aim is to improve decision making, time effectiveness and patient outcomes.⁶

For management of parathyroid disease, the MDT meeting approach is not yet widely used across the UK, perhaps because of specialised care and relatively small numbers of cases. There is little literature suggesting that this approach is widely used in the UK. Given the complexity of parathyroid disease in terms of diagnosis and management, the MDT meeting offers better communication between specialists. This allows for joint patient management between endocrine medicine and surgery departments, quicker and appropriate radiological assessment of patients, and the benefit of a safety net to reduce errors.

The purpose of setting up a parathyroid MDT meeting was multifactorial (Table I). It aimed to: allow co-ordination of care between specialties;

TABLE I
AIMS OF MONTHLY PARATHYROID MDT MEETING

Co-ordination of care between specialties
Minimal delay to patients, from time of referral to decision on management
Imaging performed by specialist radiologist
More efficient pre-operative localisation of lesion
Ensure patient suitability for surgery
Advance techniques & improve education for trainees
MDT = multidisciplinary team

minimise delay for patients in terms of time from referral to a decision on management; ensure imaging is performed by a specialist radiologist, leading to more efficient pre-operative localisation of lesions; ensure patient suitability for surgery; and advance techniques and improve education for trainees. For these reasons, a parathyroid MDT meeting was set up in November 2014 at East Sussex Healthcare Trust.

Materials and methods

In November 2014, a monthly cross-site MDT meeting was set up at East Sussex Healthcare Trust, consisting of two district general hospitals, in the UK. The members whose presence was required at each meeting included: a consultant endocrinologist, an ENT surgeon, and a consultant radiologist with experience in head and neck imaging including nuclear medicine. It was decided that all parathyroid ultrasound scans should be performed by a dedicated head and neck radiologist.

Initial referrals for patients with high calcium or high parathyroid hormone levels were made via general practitioners to the endocrinology department. Further tests and imaging were performed where appropriate, and then patients were discussed in the MDT meeting. Local general practitioners and consultant colleagues were advised, via local update forums and by biochemists, to refer any patients with symptomatic and asymptomatic hypercalcaemia for endocrine evaluation and further management. Referral and evaluation was based on the Endocrine Society's Fourth International Workshop on the Management of Asymptomatic Primary Hyperparathyroidism 2014 guidelines.⁷

In each meeting, for each patient, a biochemical diagnosis of primary hyperparathyroidism was confirmed, imaging was reviewed, and a decision on conservative, medical or surgical management was made. Imaging protocols were agreed between all members of the MDT. Consideration for surgery was dependent on serum calcium level, complications including skeletal and renal, and fitness for anaesthesia and surgery, in line with the Endocrine Society's guidelines.⁷

Data were reviewed for each patient discussed from the time the parathyroid MDT meeting was introduced, in November 2014, over a 12-month period. In addition, imaging performed prior to the meeting and the specific outcome for each patient were analysed.

Criteria for general practitioners were developed to allow for the smoother transition of patients from primary to secondary care. Endocrine physicians focused on the diagnosis of primary hyperparathyroidism, and all parathyroid imaging was only performed after specialist review.

A survey was sent out to each of the MDT members following 12 months of using the parathyroid MDT meeting, to determine its usefulness on a subjective basis.

Results

Over 12 months, a total of 118 patients were discussed at the parathyroid MDT meeting. Of these, 79 (67 per cent) were new referrals. The remaining 39 patients (33 per cent) had been discussed at a prior meeting, and referred for conservative or medical management and re-discussion, but were not deemed suitable for surgical intervention or further imaging.

Imaging performed

Of the new parathyroid patients discussed, 73 (92 per cent) had an ultrasound, and either planar sestamibi or single-photon emission computed tomography (CT)/CT (with or without contrast), prior to the meeting (Table II). Five patients (7 per cent) had an ultrasound only, and one patient (1 per cent) was referred to the MDT meeting having had no imaging at all.

We examined patterns of imaging use over the year, which modalities were undertaken and in which order. Over the year, a system was developed to streamline imaging. Patients were initially referred for ultrasound (performed by consultant radiologist with an interest in head and neck imaging), and then referred for incorporated planar sestamibi and single-photon emission CT/CT. If the imaging was found to be inadequate for parathyroid lesion localisation, patients then went on to have a contrast-enhanced CT scan of the neck.

Patient outcome

Patient outcomes were analysed for all 79 new parathyroid referrals discussed at the meeting over 12 months. Thirty-four patients (43 per cent) were referred for surgery, and 32 (41 per cent) had a trial of conservative or medical management and were up for re-discussion at a later date (Table III). Thirteen patients (16 per cent)

TABLE II
IMAGING PERFORMED ON PARATHYROID DISEASE PATIENTS*

Imaging	Patients (n (%))
Ultrasound only	5 (7)
Ultrasound, sestamibi, CT with contrast	73 (92)
No imaging	1 (1)

*Conducted prior to being discussed at the multidisciplinary team (MDT) meeting. CT = computed tomography

TABLE III
OUTCOMES FOR PARATHYROID DISEASE PATIENTS*

Outcome	Patients (n (%))
Referred for surgery	34 (43)
Referred for further imaging	13 (16)
Trial of medical or conservative treatment, & re-discussion	32 (41)

*For those discussed at the multidisciplinary team meeting

were referred for further imaging, which included magnetic resonance imaging (MRI) and CT/sestamibi in those patients who had only undergone an ultrasound prior to the meeting. This involved a combination of MRI (used for problem solving) or additional post-contrast CT in patients who had only undergone a planar sestamibi, or planar sestamibi with single-photon emission CT/CT in those who had only undergone an ultrasound scan.

Team member survey

A survey, developed using the online survey development software SurveyMonkey®, which comprised 5 questions, was sent out to the 10 parathyroid MDT members (2 radiologists, 2 surgeons and 6 endocrine physicians). The members were asked to score certain MDT meeting characteristics out of 10, and averages were calculated (Figure 1). According to the survey findings, there was a general consensus that patient management had improved. The following areas were scored from 1 to 10, comparing the time before the MDT meeting introduction to now: overall management of patients, teaching and education of trainees, time from identification of parathyroid disease to decision on management, standardisation of imaging performed, ease of communication between specialties.

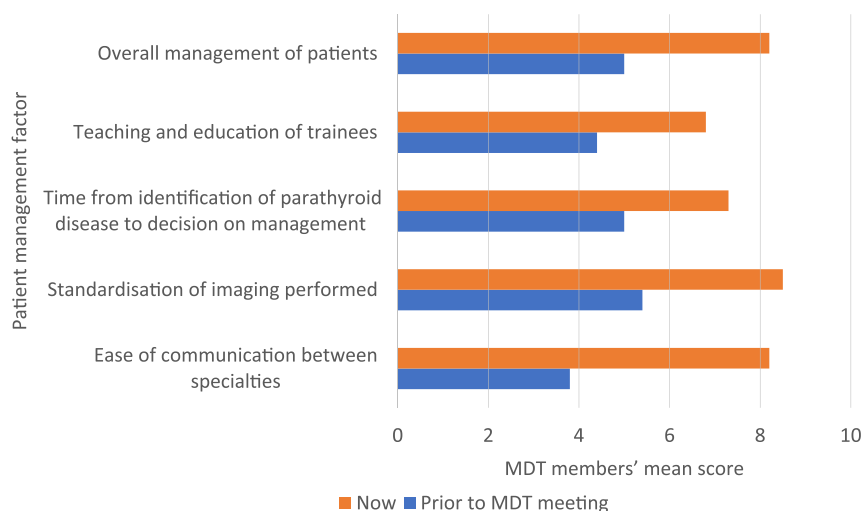


FIG. 1

Results (mean scores, out of 10) from a survey of multidisciplinary team (MDT) meeting members (ENT surgeons, endocrinology consultants and radiology consultants), who were asked about their views on patient management prior to the MDT meeting introduction compared to now.

performed, and ease of communication between specialties. All areas subjectively showed improvement.

Discussion

The MDT approach to patients with parathyroid disease in this Trust has been found to be far superior compared to prior to its introduction. The aims of the meeting, set in November 2014 (Table I), were met within a year of its introduction.

Prior to setting up the parathyroid MDT meeting, there was a perceived weakness in the Trust regarding the management of patients with parathyroid disease, which is likely to be representative of the situation in many other healthcare trusts around the UK. A number of problems were identified, which were the driving force for the introduction of the MDT meeting.

Before its introduction, there were inappropriate referrals to ENT surgery from primary care in patients who were unfit for surgery, or the biochemical diagnosis of primary hyperparathyroidism was incorrect. There was no coherent protocol between patients who would receive an ultrasound, CT or sestamibi scan, with some patients not undergoing any imaging at all prior to surgical consideration. This stemmed from a lack of communication between physicians, surgeons and radiologists, and a poorly co-ordinated imaging strategy, with disparity between different patients and the scans they received. The imaging performed showed a lack of specialist input at all stages; in patients receiving an ultrasound, the yield was low because of operator inexperience, with only a minority of scans being performed by consultant radiologists with head and neck experience. In addition, there were a lot of inappropriate general practitioner referrals and general practitioners undertaking incorrect or inappropriate imaging in the community. All these factors led to

delays in decision making and impacted upon timely patient management.

The use of the MDT format for management of parathyroid disease is not well established or described in the literature. Our Trust shows that it can be extremely useful.

The MDT meeting has a format for the discussion of complex patients between consultants in different specialties. This has meant that patients are discussed in a timely manner from initial consultation and therefore there are fewer delays in management decisions. Any concerns about individual patients and differing opinions between specialties were flagged up at the meeting, and discussed in a formal environment.

The involvement of all specialties has allowed for a more balanced approach to parathyroid disease management and the correct identification of those patients whom surgery may benefit. It has also provided a platform for the education of both medical and surgical trainees, allowing for a better understanding of the biochemical diagnosis of primary hyperparathyroidism, imaging and surgical management of these patients.

General practitioner guidance at local meetings has allowed for smoother transition of patients from primary to secondary care. There are now fewer inappropriate referrals and fewer imaging scans being performed in the community.

Over the year since the parathyroid MDT meeting was introduced, the patterns of imaging use changed as a result of direct feedback and continual radiology review of what imaging was most helpful. Parathyroid ultrasound is now only performed by a specialised consultant radiologist. This has led to greatly improved yield and usefulness of the imaging modality, thereby reducing the number of scans needing to be repeated.

The Trust has thus developed a co-ordinated, cross-site imaging strategy, which has been essential to improving correct and timely decision making. Initially, most patients were having ultrasound plus planar sestamibi; this has changed to ultrasound plus single-photon emission CT/CT, alongside planar sestamibi, with the introduction of a combined scanner half way through the year. This explains the number of patients being referred for further imaging (16 per cent) following discussion at the MDT meeting, mostly in the first half of the year.

The combination of ultrasound, planar sestamibi and single-photon emission CT/CT was found to be the most useful imaging combination to allow superior anatomical detail for correct identification of parathyroid lesions and subsequent surgical planning. It was found to be beneficial to perform the single-photon emission CT/CT scan at the same time as the planar sestamibi in order to prevent delays in diagnosis or management. The risk of the additional ionising radiation dose was weighed against the benefit of better lesion localisation and improved anatomical detail. The planar sestamibi scan allows for identification of the parathyroid adenoma, whilst single-photon

emission CT/CT forms a three-dimensional image to give more accurate localisation. This is especially useful for para-oesophageal lesions, and localises the uptake to inside or outside the thyroid.

If deemed necessary by the MDT, patients then undergo a CT scan with intravenous contrast, or MRI. This improves anatomical delineation by enhancing vessels further around the parathyroid lesions to further assist in surgical planning.

The combined use of ultrasound, sestamibi and single-photon emission CT/CT in a surgical setting can determine which cases can undergo minimally invasive parathyroidectomy, as it gives the potential for better lesion localisation. This in turn means that more procedures can be performed as a day case. The risk of complications will be reduced (including vocal fold palsy, post-operative bleeding and pain), as the procedure is one-sided and less invasive.⁸ This can reduce the duration of patient hospitalisation and determine the number of day-case procedures that it is possible to perform.

The main benefits of the parathyroid MDT meeting are that it is held at regular monthly intervals, with all core specialties in attendance. This enables direct surgical feedback, to assist in biochemical diagnosis, and improves imaging techniques and protocols. It was particularly useful to have specialised consultant radiologist input in both ultrasound scanning and reporting, and at the nuclear medicine and single-photon emission CT/CT level.

- **Parathyroid multidisciplinary team (MDT) meetings allow organised, face-to-face, regular contact of specialties caring for parathyroid disease patients**
- **Having this forum prevents delays in patient diagnosis and management**
- **Parathyroid ultrasound scans are now all performed by a dedicated consultant radiologist with head and neck knowledge**
- **An imaging strategy has been developed for all patients with confirmed primary hyperparathyroidism**
- **This entails ultrasound plus single-photon emission computed tomography (CT)/CT, with planar sestamibi prior to MDT discussion**
- **Patient management is considered much improved by MDT members following introduction of the MDT meeting**

The study had some limitations. There were no data available prior to the introduction of the parathyroid MDT meeting, only subjective data from the MDT members who were managing these patients prior to its introduction and who were therefore the best

placed to offer an opinion on its usefulness. We have not formally looked at surgical outcomes pre- and post-MDT meeting because of changes in operator personnel.

Conclusion

The MDT approach to parathyroid disease management has been extremely useful. It has streamlined referrals and allowed better communication between the specialties, which has positively impacted on the way we manage these patients. The standardisation of imaging, and particularly the fact that all ultrasound scans are performed by a specialised consultant radiologist, along with the introduction and use of single-photon emission CT/CT with intravenous contrast, has allowed better localisation of lesions and therefore better surgical planning. Overall, it has improved the evaluation of patients with parathyroid disease, and we hope that other healthcare trusts can use our lessons to partake in setting up their own parathyroid MDT meeting.

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