Ultrasound-Guided Resection in Autograft-Dependent Recurrent Secondary Hyperparathyroidism

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ABSTRACT

Background: Graft-dependent recurrent secondary hyperparathyroidism may occur after a total parathyroidectomy and autotransplantation in almost a quarter of patients.

Methods: Ultrasound-directed en bloc resection of a sternomastoid-sited parathyroid autograft and the surrounding muscle was performed in a patient with recurrent secondary hyperparathyroidism.

Results: Resolution of hyperparathyroidism occurred after the ultrasound-directed resection of the autograft was performed.

Conclusion: The technique described is simple and effective. It allows for a focused operative approach ensuring complete excision of parathyroid tissue, thus reducing the risk of further recurrence.

Keywords: Hyperparathyroidism, Secondary, Parathyroidectomy, Ultrasonography.

INTRODUCTION

A commonly accepted approach for the treatment of secondary hyperparathyroidism involves parathyroidectomy and autotransplantation of parathyroid tissue remnant into a muscle pouch in the sternomastoid within the neck or brachioradialis in the forearm. Autograft-dependent recurrence of hyperparathyroidism has been reported to occur in up to 26.6% of cases at 25 years after the initial operation. Recurrences in the autograft have been localized with ultrasonography, 99 mTc-sestamibi, computed tomography (CT) and magnetic resonance imaging (MRI), preoperatively in previous reports. Removal of the autograft en bloc with the surrounding muscle (so as to avoid remnant disease or spillage) is the treatment of choice for graft dependent recurrence. We present an approach of using ultrasound intraoperatively to guide excision, and thus ensure that all parathyroid tissue is removed.

TECHNIQUE

A 33-year-old patient with chronic renal failure and a failed transplant was referred with a recurrence of secondary hyperparathyroidism (parathyroid hormone level = 63 pmol/L; reference range 1.0-7.0 pmol/L). Nine years previously, he had successfully undergone parathyroidectomy (four glands were removed and confirmed with frozen section and subsequent histology) and thyroidecmy, with a reimplantation of a parathyroid remnant into the right inferior sternomastoid. Following the diagnosis of recurrent secondary hyperparathyroidism, further imaging was performed to localize the source of recurrence. A sestamibi isotope scan demonstrated a hyperfunctioning focus at the right base of his neck in the region of lower end of sternomastoid muscle (Fig. 1) and on neck ultrasound examination a multiloculated/multifocal complex lesion measuring approximately 16 mm was found within the lower third of his right sternomastoid muscle (Fig. 2). An ultrasound guided FNA of the mass confirmed the presence of parathyroid tissue. This area was not clinically palpable. He came forward for surgical resection of this parathyroid complex using intraoperative ultrasound to locate the lesion.

Intraoperatively, the complex nodule within the lower right sternomastoid muscle was localized with on-table surgeon-performed ultrasonography utilizing a GE LOGIQ i ultrasound system (Fig. 3). Skin marks were placed to define the peripheral margins of the lesion, above and below and medially and laterally, in order to outline the site and size of the lesion, including its multifocal components and an incision was placed over the site of the mass. The lower end of the sternomastoid muscle was surgically displayed and the position of the lesion complex was again confirmed using ultrasound placed into the wound, and a segment of musculature (which contained the parathyroid tissue nodules) was excised. The presence of the parathyroid autograft within the removed muscle was confirmed with ultrasonography of the surgical specimen (Figs 4 and 5).
Hyperplastic tissue. In resection specimens of explanted autografts with their surrounding tissue, the nodular proliferations have been shown to form small nests of parathyroid tissue next to, and some distance from, the main mass of the autograft, resembling an invasive growth. While it is preferable to use diffuse type hyperplastic tissue for autotransplantation, this may not always be available, nor can it reliably be recognized as such at time of surgery.

Removal of the autograft en bloc with the surrounding muscle, so as to avoid spillage or residual disease, is the treatment of choice for graft-dependent recurrence of hyperparathyroidism. The removal of an autograft from an intramuscular site can be difficult because of local invasive behavior of the transplanted cells and the difficulty in distinguishing the fragmented parathyroid tissue from the surrounding muscle. This can result in a wide resection of muscle tissue and potential cosmetic deformity or the possibility of incomplete resection.

The method of utilizing intraoperative ultrasound guidance described aids to complete resection of all parathyroid tissue. A fragment may then be reimplanted. Alternatively, cryopreservation of explanted parathyroid tissue allows the possibility of a later transplantation, if necessary.

An alternatively described approach to the problem of graft-dependent recurrence is intraoperative radioguided parathyroidectomy. Following preoperative injection of technetium-99m-labelled sestamibi the autograft is resected using the guidance of a gamma probe. The probe may be used to confirm the presence of hyperplastic parathyroids after resection with a high sensitivity (97%).

**CONCLUSION**

Surgeon-performed ultrasound-guided excision of a parathyroid autograft in recurrent hyperparathyroidism is a simple and
efficient technique which requires basic skills in ultrasonography, but which ensures accurate localization and complete removal of the lesion complex, thus reducing the risk of future recurrence.

REFERENCES


