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Scientific letter

Implementation of a radio-guided selective parathyroidectomy protocol: Preliminary results

Implementación de un protocolo de paratiroidectomía selectiva radioguiada. Resultados preliminares

Minimally invasive radioguided parathyroidectomy (MIRP)[1,2] has been implemented at the Hospital Universitario de Navarra as part of a Prospective Research Project, authorized by the Ethics Committee (October 2019), with the aim of improving our previous success rate in selective parathyroidectomy (94.6%)[3].

Since its initial implementation in February 2020 and until December 2021, we have performed MIRP (with MIBI or MAA)[2] consecutively on all patients with primary hyperparathyroidism and an indication of minimally invasive parathyroidectomy (80). Mean age was 61.1 years (±11.2), and 61 patients were women (76.3%). Clinical and analytical data are shown in Table 1.

We performed MIRP-MIBI after intravenous administration of 5 mCi ^{99m}Tc-MIBI, with immediate scintigraphy study and radioguided surgical procedure approximately 60 minutes later. To perform MIRP-MAA, 0.5 mCi of intralesional ^{99m}Tc-macroaggregated albumin is administered under ultrasound guidance on the same day of the intervention, with subsequent scintigraphic acquisition (SPECT/CT). Intraoperatively, we use a Neo2000® (Neoprobe Corporation, Dublin, EE.UU.) gamma probe (9 mm head) and a Sentinella® portable gamma camera (Oncovision, Valencia, Spain).

The preoperative MIBI-SPECT/CT and ultrasound diagnostic studies had identified the pathological gland in 70 (87.5%) and 59 (73.7%) patients, respectively, the rest being negative or inconclusive (Table 1). In the 30 cases (37.5%) in which one of the tests was negative or not totally concordant, choline and/or methionine PET were performed, which were diagnostic in 28 (93.3%).

Radioguided surgery was minimally invasive in 77 patients (96.3%), including the two with a history of cervical surgery (one total thyroidectomy, one previous failed selective parathyroidectomy). Three (3.7%) required extension of the initial incision: 2 due to involvement of two contralateral glands, one due to the posterior ectopic location of the adenoma.

Surgical resection of the lesion was achieved in 79 patients (98.7%), 76 (96.2%) of which were adenomas and 3 (3.8%) hyperplasia (Table 1). Two presented double lesions: one adenoma, one hyperplasia. Mild surgical complications were recorded in 4 (5%): one small self-resolving subcutaneous hematoma, two transient hypocalcemia, and one vocal cord paresis.

According to the previous evaluation of the localization study[4], we indicated MIRP-MAA in 18 patients (Table 1) and performed it in 17 (in one patient, scintigraphy showed extensive skin contamination due to radiotracer leakage during ultrasound inoculation, invalidating the procedure). Since the parathyroid lesion was MIBI-positive, MIBI was then injected and finally excised. The lesion marked with MAA was resected in the remaining 17, and the mean surgical procedure time was 35.8 min. In 9 patients, we observed significant residual uptake in the surgical bed after resection of the radiolabeled gland (dispersion of the radiotracer to the thyroid or pre-thyroid muscles during its administration). In one, scintigraphy also demonstrated abnormal localization of MAA in the lungs (partial intravascular administration – innocuous); in another, a discreet post-injection subcutaneous hematoma, which resolved itself.

MIRP-MIBI was performed in 63 patients (Table 1), confirming resection of the parathyroid lesion in 62 (98.4%). In the only ‘failed’ surgery, a weakly MIBI-positive lesion was removed, which was macroscopically suggestive of parathyroid; however, the histopathology results identified it as an adenopathy, which can uptake MIBI on occasion[5]. The mean time between MIBI administration and the start of the procedure was 90 min. The mean duration of the MIRP-MIBI was 33.3 min, shorter than the MAA (not significant, p = .349). There were also no significant differences in the size of the excised lesion (p = .504).

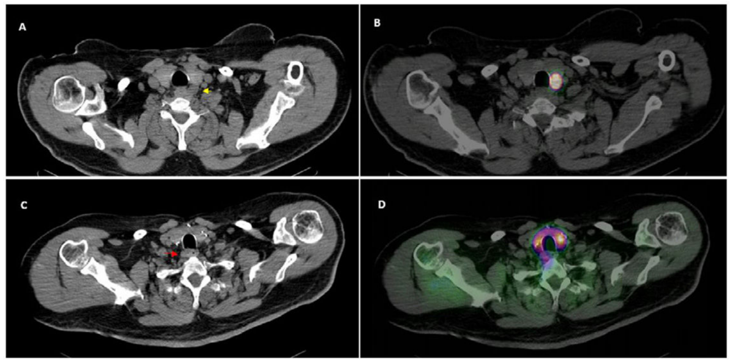

Fig. 1 – Patient with PHPT who underwent resection of a parathyroid adenoma (yellow arrow) located posterior to the caudal pole of the left thyroid lobe (A) by means of MIRP after ultrasound-guided administration of ^{99m}Tc-MAA. The transaxial fusion SPECT/CT image shows the correct intralesional location of the radiotracer (B). Hypercalcemia persisted one year later, and a new parathyroid lesion was observed (C) in a more caudal right paraesophageal ectopic location (red arrow) with significant uptake of ^{99m}Tc-MIBI as shown in the SPECT/CT fusion image, (D) which was satisfactorily removed in a second surgery, this time radioguided with MIBI.

Table 1 – Patients with indication for MIRP. Results.

Mean age (years)	61.1 ± 11.2
Sex N (%)	
Females	61 (76.3)
Males	19 (23.7)
Body mass index (kg/m$_2$)	26 (IQR:23–30)
Biochemical parameters	
calcium (mg/dL)	10.9 ± 0.66
parathormone (pg/mL)	188 (IQR: 147.2–256.0)
Vitamin D (ng/mL)	23 (IQR: 14–29)76 (96.2)
Underlying thyroid nodular pathology	
No	41 (51.2%)
Yes	39 (48.8%)
Previous cervical surgery	
No	78 (97.5%)
Yes	2 (2.5%)
Preoperative localization, N (%)	
MIBI	70/80 (87.5)
Ultrasound	59/80 (73.7)
PET	28/30 (93.3%)
Surgical localization, N (%)	**79 (98.7)**
Adenoma	76 (96.2)
Hyperplasia	3 (3.8)
Surgical approach, N (%)	
Minimally invasive	77 (96.3)
Extension of initial incision	3 (3.7)
Radioguided surgery, MIBI: N (%)	**63 (78.7)**
Localization of PT lesion	62 (98.4)
Technical difficulty	0
Mean intervention time (min.)	33.3 ± 18.6
Mean gland weight (mg)	1273.0 (220–17000)
Radioguided surgery, MAA: N (%)	**17 (21.3)**
Localization PT lesion	17 (100)
Technical difficulty[a]	9 (52.9)
Mean intervention time (min)	35.8 ± 17.1
Mean gland weight (mg)	1324.7 (270–5860)

[a] Related with the administration (confirmation of radiotracer extravasation resulting in the intraoperative uptake by tissues other than the parathyroid).

In total, 22 ectopic adenomas (27.5%) were resected using MIRP-MIBI: 9 paraesophageal, 7 mediastinal, 3 pretracheal, 2 prevertebral, and 1 intrathymic.

During the 6-month follow-up, the only MIRP in which a pathological parathyroid gland was not demonstrated histopathologically presented biochemical cure, which is an exceptional clinical circumstance[6]. Two presented persistent hypercalcemia, despite resection of an adenoma; one was recently and successfully reoperated on (Fig. 1) after finding a new parathyroid lesion (MIBI and PET-positive). The provisional cure rate was 97.5%.

MIRP-MIBI requires strict coordination between the nuclear medicine unit and the operating room, which has been satisfactory in our setting. However, the time between injection and start of surgery exceeded the initially set objective due to intra-hospital patient transfers. The physiological fixation of MIBI in nearby tissues (thyroid, muscle), can make surgical detection difficult, especially in the case of parathyroid glands with low intensity of uptake[7] and/or 'rapid washout' (preoperative study). Thus, the intraoperative image (portable gamma camera) is very useful, as it minimizes this drawback and confirms excision of the lesion.

MIRP-MIBI allows for minimally invasive resection of ectopic lesions[8].

Although the surgical procedure with MAA is, in principle, technically simpler, difficulties in ultrasound-guided intralesional administration are not uncommon, probably due to the depth and small size of the lesions and/or the learning curve.

In conclusion, we have implemented MIRP with both MIBI and MAA at our hospital, and these interventions have developed smoothly thanks to the close collaboration of the professionals involved. The surgical team finds the MIRP to be easier. We believe that the method used is reproducible in any Endocrine Surgery Unit. Although the number of cases and follow-up are limited (including most interventions in the last few months, due to the interruption of surgical activity as a result of the pandemic from March-September 2020), the favorable results allow us to dispense with the intraoperative histological study. Nonetheless, the inclusion of more patients will determine the impact on surgical success and cure rate, as well as the duration of the intervention and the rate of complications.

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Algorithm for management of extraperitoneal colorectal anastomotic leakage. Incorporation of TAMIS

Algoritmo de actuación en la dehiscencia anastomótica colorrectal extraperitoneal. Incorporación de la cirugía TAMIS

Leakage from the colorectal anastomosis is one of the most feared complications after rectal cancer surgery[1]. When faced with this complication, the management strategy must be individualized to control the septic focus and try to preserve the intestinal continuity[2,3]. The combined transanal and transabdominal approach is an emerging treatment for anastomotic leaks[3,4]. The objectives of associated transanal revision during surgical reoperation are to assess the state of the tissues and the extent of the defect in order to carry out local treatment[5]. The current trend is to try to repair the defect, performing it in the first reoperation or in a second intervention after applying vacuum therapy and having achieved better control of the septic focus. This strategy aims to reduce the morbidity and mortality of this complication, preserve and reconstruct viable anastomoses, reduce the incidence of chronic