

# IMPACT OF NEAR-INFRARED PARATHYROID FLUORESCENCE (NIRAF) FOR TARGETED PARATHYROIDECTOMY CHANGING THE PARADIGM FOR THE MANAGEMENT OF PRIMARY HYPERPARATHYROIDISM

Jose Luis Carrillo Lizarazo<sup>1,3</sup>, Bakkar Sohail<sup>2</sup>, Sofia di Lorenzo<sup>3</sup>, Gianluca Donatini<sup>3</sup>

<sup>1</sup>Endocrine Surgery Unit, University Hospital of Padua, Italy; <sup>2</sup>The Hashemite University Faculty of Medicine, Department of General surgery, Jordan <sup>3</sup>CHU Poitiers – University of Poitiers, France

**INTRODUCTION**

In primary hyperparathyroidism (pHPT), preoperative localization imaging techniques, is essential for successful focused and minimally invasive surgical approaches. However, intraoperative detection of abnormal parathyroid gland (PGs) still heavily relies on the surgeon's expertise confirmed through frozen section (FS) and intraoperative decline of parathyroid hormone (ioPTH) analysis is employed. This may lengthen the overall procedure resulting in increased cost per single surgery.

**The study evaluates the impact of NIRAF in patients with pHPT undergoing targeted parathyroidectomy surgery.**

**METHODS**

82 consecutive patients who underwent surgery for pHPT (2021-2023) were analyzed. All had concordant preoperative localization imaging [neck ultrasound (US) + 99mTc-sestamibi-SPECT/CT scintigraphy (MIBI)].

According to intraoperative method used to confirm the correct localization of the abnormal parathyroid gland and the consequent surgical success

**TRADITIONAL GROUP (TG)**      **NIRAF GROUP (NG)**

In 26 patients **FS + ioPTH descent according to the Miami criteria** was used      In 59 patients, **NIRAF and its characteristic heterogeneous pattern** was used

**RESULTS**

	TRADITIONAL group (TG) n=26	NIRAF group (NG) n=59	P value
Sex, n			
F	22	45	0.38
M	4	14	
Age, mean (SD), years	66.34 (11.50)	64.28 (13.09)	0.47
Pre-operative calcium, mean (SD), mmol/L	2.75 (0.12)	2.73 (0.11)	0.5
24-h urinary calcium, mean (SD), mg/24h	383 (183.46)	366 (199)	0.70
Pre-operative PTH, mean (SD), pg/ml	279.40 (255.35)	231.37 (157.4)	0.38
Largest dimension of PG in the pathological report, mean (SD), millimeters	18.84 (9.34)	18.89 (7.91)	0.98
Type of disease			
Hyperplasia	1	2	0.91
Adenoma	25	57	
Overall time of surgery (incision-skin closure), mean (SD), minutes	57.8 (16.84)	32.86 (11.86)	<b>&lt;.0001</b>
Cure (%)	100%	100%	

**Normal PG**

**Pathological PG**

**Legend.** PGs (parathyroid glands); PTH (parathyroid hormone level); Nomal range of serum calcium (2.20-2.55 mmol/L); Nomal range of serum PTH (8-84 pg/ml); reference range for 24-h urine calcium (100-300 mg/24h).

**CONCLUSIONS**

The use of NIRAF in selected patients with pHPT undergoing targeted surgery with concordant preoperative localization imaging may represent a safe and reliable management to decrease overall cost of surgery, replacing ioPTH and frozen section.