Intraoperative demonstration of a good vascularisation of at least one parathyroid gland using indocyanin green fluorescence reliably predicts the absence of postoperative hypoparathyroidism

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Background
Post-operative hypoparathyroidism remains the most common complication after thyroidectomy. Intraoperative parathyroid angiography (IOPA) using a fluorescent dye is a new procedure that could predict the function of each individual parathyroid gland and the absence of hypoparathyroidism in patients with at least one well vascularized parathyroid gland.

Results
IOPA added 6 ± 2.3 minutes to the surgery time. A mean of 2.85 ± 0.68 parathyroid glands were identified in each patient. PTH and calcium levels at POD1 were 3.28 ± 1.41 pmol/L (normal range 1.1 – 6.8 pmol/L) and 2.27 ± 0.1 mmol/L and at POD10 3.89 ± 1.93 pmol/L and 2.32 ± 0.02 mmol/L, respectively. All 30 patients had PTH levels in the normal range at POD1. One patient showed a light, asymptomatic hypocalcemia with normal PTH value at POD1, with normal calcium and PTH values at POD10.

Methods
Between May and October 2014, 36 patients underwent total thyroidectomy and IOPA with intravenous administration of 3.5mL IndoCyanine Green (ICG). A prototype laparoscopic system (PinPoint, NOVADAQ) was used to provide high definition white light, near-infrared irradiation and backfiltration specifically tuned for ICG to visualize the vascularization of the identified parathyroid glands after the removal of the thyroid. Thirty patients had at least one well vascularized parathyroid gland and represent the subjects of this study. All patients received systematic Calcium (400 mg bid) and 25-OH-Vitamin D (400 ug bid) supplementation. Data collection was done prospectively.

Conclusions
We demonstrate in this preliminary study that when at least one parathyroid gland is well vascularized, the PTH level on POD1 is in the normal range in 100% of the patients, suggesting an excellent correlation between parathyroid perfusion and function. If these results are confirmed, it would be the only currently available tool to predict the ABSENCE of hypoparathyroidism after the resection of the first side and therefore could be used to adapt the extent of the resection of the second side. Furthermore, it opens opportunities to avoid systematic dosage of calcium and/or PTH levels post-operatively, as well as systematic Calcium and Vitamin D supplementation and could facilitate ambulatory surgery.