

Methods: Comprehensive searches of PubMed, EMBASE, and Cochrane databases were performed and quality of included papers was assessed using the Cochrane risk of bias tool and a modified Newcastle-Ottawa Scale (NOS). The results of included studies were summarised and meta-analyses were performed where appropriate.

Results: Five randomised controlled trials (RCTs) and thirteen interventional cohort studies were included. Thirteen studies assessed the role of IONM in primary thyroid surgery, three in re-do procedures and two in minimally-invasive video-assisted thyroidectomy (MIVAT).

Meta-analysis demonstrated: marginally significant lower rates of transient RLN palsy associated with the use of IONM in primary thyroid surgery (OR 0.71; 95% CI 0.50 - 1.00; $p = 0.05$); significant lower rates of transient RLN palsy associated with the use of IONM in revision thyroid surgery (OR 0.59; 95% CI 0.36 - 0.97; $p = 0.04$); no significant effect on permanent RLN injury in primary thyroid surgery (OR 0.84; 95% CI 0.47 - 1.50; $p = 0.55$); and no significant effect on transient RLN injury in MIVAT (OR 0.55; 95% CI 0.17 - 1.74; $p = 0.31$).

Conclusion: This systematic review has shown that IONM can aid the surgeon to reduce the rates of transient RLN injury in primary and revision thyroid surgery. The wide variability in study design, definitions of RLN palsy and methods of assessing nerve injury were the main limitations encountered in this study.

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Presentation 16. Electrical impedance spectroscopy of rabbit thyroid and parathyroid glands

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Background: Accurate identification of parathyroid glands during thyroid surgery is crucial to avoid post-thyroidectomy hypocalcaemia. Electrical impedance spectroscopy has the potential to differentiate between tissues of different morphology. The aim of this study was to determine the electrical impedance patterns and differences in the soft tissues of the rabbit neck.

Methods: Thyroid and external parathyroid glands were exposed in nine freshly culled New Zealand White rabbits. Electrical impedance was measured from thyroid lobes, external parathyroids and strap muscle using the APX100™ device both *in vivo* and *ex vivo*. Specimens of all identified glands were sent for histopathology examination.

Results: Histology confirmed accurate identification of all excised thyroid and parathyroid glands. The impedance was higher for thyroid tissue at lower frequencies and for parathyroid tissue at higher frequencies. *Ex vivo* electrical impedance spectra were significantly higher compared to the *in vivo* spectra across all frequencies for thyroid and parathyroid tissues ($p < 0.001$). The ratio of low to high frequency *in vivo* impedance of thyroid, parathyroid and muscle was significantly different ($p < 0.001$), allowing for differentiation between these tissues.

Conclusion: The electrical impedance spectra of rabbit thyroid and parathyroid glands are distinct and different from skeletal muscle. If these results are replicated in human tissue, they have the potential to improve patient outcomes by achieving early identification and preservation of parathyroid glands.

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Presentation 17. Diagnosing thyroid nodules with the combined role of ultrasound scans and fine needle aspiration – Towards an enhanced accuracy and a more efficient care

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Background: The standard first-line investigation of thyroid nodules is Ultrasound scan (USS). It is safe, quick and radiation-free. This study aims to examine the sensitivities of USS and FNAC respectively, evaluating our centre's practice.

Methods: Retrospective data were collected from USS and FNAC reports of patients who were histologically proved to have thyroid malignancy after thyroidectomy between the period of January 2010 and October 2013 in a regional surgical endocrine unit in the UK. USS results were categorised into benign, indeterminate and suspicious of malignancy; while FNAC results had five categories including non-diagnostic (Thy1), non-neoplastic (Thy2), follicular (Thy3), suspicious (Thy4) and diagnostic (Thy5). Sensitivities were determined.

Results: 100 patients were histologically diagnosed with thyroid malignancy during the period. 81 patients had both USS and FNAC reported. The sensitivity of USS was 39% (positive if suspicious of malignancy) and that of FNAC was 59% (positive FNAC if Thy3, 4 or 5). Of the positive scan results for thyroid malignancy, 66.6% also had a positive FNAC. The average number of months between ultrasound appointment and first surgical procedure was 2.8.

Conclusion: The combined sensitivity of USS and FNAC is statistically higher than that of each test on its own in the management of thyroid malignancy. Most patients have both tests done especially if there is diagnostic ambiguity on their clinical presentations before thyroidectomy. Based on the results of this study and the consistency in recent literatures, FNAC should be readily available at USS appointment to avoid the delay of any surgical management. This study warrants the use of one-stop clinic providing ultrasound-guided FNAC that would not only enhance the diagnostic accuracy but also provide more efficient care for patients presenting with thyroid nodules. Further research is required to investigate the cost-effectiveness of a one-stop clinic.

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Presentation 18. Hypercalcaemia following Alfacalcidol for post-surgical hypoparathyroidism – An underestimated complication?

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Background: Post-operative hypocalcaemia is a common complication of thyroid and parathyroid surgery, which can be treated with a combination of calcium and active Vitamin D supplements, such as Alfacalcidol. Although reportedly uncommon, we observed several cases of Alfacalcidol induced hypercalcaemia within a short period of time; of these patients, two developed acute renal failure secondary to hypercalcaemia.

Aims: To determine the incidence of hypercalcaemia in patients treated with Alfacalcidol for post-surgical hypocalcaemia, and explore factors predisposing to this complication.

Methods: retrospective cohort study of patients prescribed Alfacalcidol for hypocalcaemia following thyroid or parathyroid surgery. All prescriptions for Alfacalcidol in a three-year period were reviewed, and clinical and biochemical characteristics for these patients were ascertained. The main outcomes measured were the occurrence of hypercalcaemia, and any association between potential patient and treatment related factors and the risk of hypercalcaemia.

Results: Of 61 patients prescribed Alfacalcidol for post-surgical hypocalcaemia, 17 (27.9%) developed hypercalcaemia. Of these, one patient had a significant clinical event (acute admission with dehydration and renal impairment). Exploratory analyses did not identify any significant