

Permanent Hypoparathyroidism Following Total Thyroidectomy – Incidence and Preventative Strategies

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Introduction

Permanent hypoparathyroidism (pHypoPT) is the most common complication of total thyroidectomy, with reported rates of 12.5-14.5% in registry studies. The risk of pHypoPT is significantly associated with surgeon volume and experience.

Aims

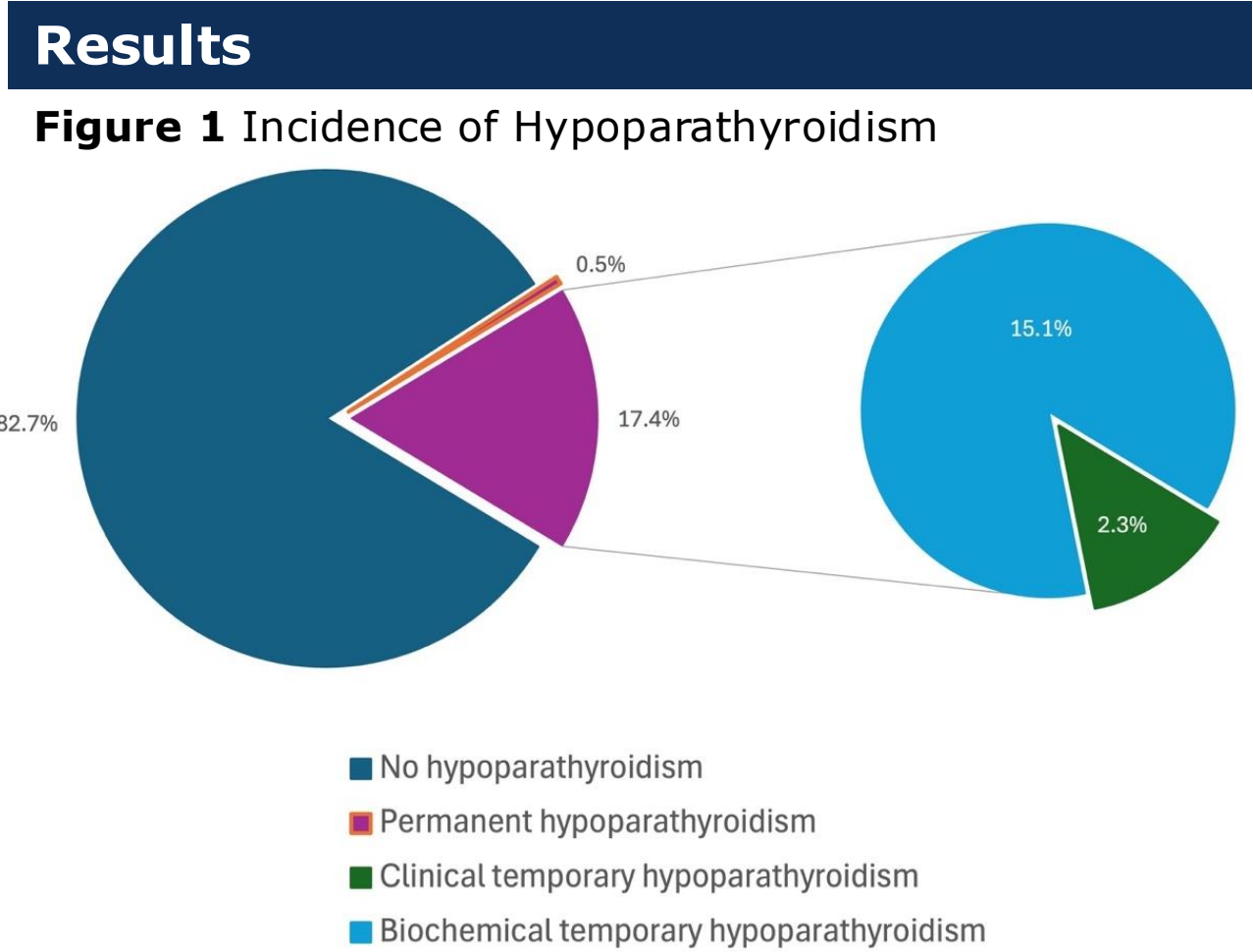
To describe the **incidence** and **predictors** of postoperative hypoparathyroidism in a consecutive series of patients treated in a high-volume centre and **define strategies** to reduce the risk of pHypoPT.

Methods

We analysed the clinical and operative data of **1182 consecutive patients** who underwent total thyroidectomy between April 2018 and June 2022 at the University of Sydney’s Endocrine Surgery Unit. Follow up data was collected prospectively.

**Temporary hypoparathyroidism (tHypoPT)** was defined as PTH <0.4 pmol/L at 24 hours postoperatively, or clinical or biochemical evidence of hypocalcaemia. **Permanent hypoparathyroidism (pHypoPT)** was defined as an ongoing need for calcitriol supplementation to maintain normocalcaemia at 12 months post-operatively.

Table 1 Summary of patient characteristics			
Variables	pHypoPT (n = 6)	tHypoPT (n = 205)	Total (n = 1182)
Age (Median, IQR) (years)	60 (26)	56 (29)	57 (26)
Female	5 (83%)	164 (80%)	927 (78%)
Indication for surgery			
Malignancy	3 (50%)	69 (34%)	411 (35%)
Graves disease	0 (0%)	22 (11%)	183 (15%)
Retrosternal goitre	0 (0%)	38 (19%)	170 (14%)
Toxic multi-nodular goitre (MNG)	0 (0%)	8 (4%)	67 (6%)
Other	3 (50%)	68 (33%)	351 (30%)
Therapeutic central neck dissection	1 (17%)	27 (13%)	97 (8%)
Number of parathyroid glands not seen			
0	4 (67%)	166 (81%)	987 (84%)
1	1 (17%)	23 (11%)	126 (11%)
2	1 (17%)	14 (7%)	54 (5%)
3	0 (0%)	2 (1%)	11 (1%)
4	0 (0%)	0 (0%)	4 (0%)
Presence of parathyroid tissue in pathology specimen	2 (33%)	39 (19%)	235 (20%)
Number of parathyroid glands auto transplanted			
0	5 (83%)	33 (16%)	371 (31%)
1	1 (17%)	69 (34%)	392 (33%)
2	0 (0%)	22 (11%)	98 (8%)
3	0 (0%)	1 (0%)	5 (0%)



**Temporary hypoparathyroidism** occurred in 205 (17.4%) patients, and 27 (2.3%) developed clinical tHypoPT with symptoms of hypocalcaemia. Four (0.3%) patients were managed in hospital and required IV calcium replacement.

**Permanent hypoparathyroidism** occurred in 6 (0.5%) patients, including 2 patients with recovery of PTH levels but ongoing requirement for calcitriol supplementation.

**Parathyroid auto-transplantation** (PA) was highly predictive of eventual recovery of parathyroid function (OR=16.1, p<0.001), with 45/46 patients who underwent PA recovering by 3 months post-op, compared with 0/5 patients who did not have PA.

**Major predictors of pHypoPT** on multivariate analysis were **symptomatic tHypoPT** (OR 27.72, p<0.001), **number of parathyroid glands in the pathological specimen** (OR 2.32, p=0.012), and **PA** (OR 0.06, p=0.010).

Conclusion

The risk of **permanent hypoparathyroidism after total thyroidectomy is 0.5%** when performed by high-volume surgeons with a low threshold to parathyroid auto-transplantation.

**Parathyroid auto-transplantation** represents an important technique in reducing the risk of pHypoPT and should be considered routinely as part of total thyroidectomy operations.

Table 2 Univariate Analysis for predictors of pHypoPT		
Variable	Odds Ratio	P value
Age		NS
Female sex		NS
Indication for surgery - MNG	11.51 (1.33-99.47)	0.026
Parathyroid auto-transplantation	0.06 (0.01-0.51)	0.010
Viable parathyroid gland identified and preserved		NS
Therapeutic central neck dissection		NS
Number of parathyroid glands in pathology	2.32 (1.21-4.47)	0.012
Symptomatic tHypoPT	27.72 (6.29-122.14)	<0.001

Table 3 Multivariate Analysis for predictors of pHypoPT		
Variable	Odds Ratio	P value
Parathyroid auto-transplantation	0.04 (0.00 – 0.34)	0.004
Number of parathyroid glands in pathology	2.31 (1.13-4.74)	0.022
Symptomatic tHypoPT	43.97 (7.46-259.31)	<0.001