*The Journal of Laryngology & Otology (2016)*, ***130***, *975–976*.

doi:10.1017/S002221511600894X



## Analysis of the incidence and factors predictive of inadvertent parathyroidectomy during thyroid surgery

*J Laryngol Otol* 2016;**130**:669–73

Dear Editors,

We recently came across the article titled 'Analysis of the incidence and factors predictive of inadvertent parathyroidectomy during thyroid surgery', by Hone *et al*.,[1] in your esteemed journal. Firstly, we would like to commend the authors on a well thought out and well written article. While the article addresses many important issues regarding the relatively common problem of inadvertent parathyroidectomy, we would like to add a few points which we feel could further enrich the content of the paper.

Preservation of all parathyroid glands decreases transient hypoparathyroidism compared with when three or fewer glands are preserved, but does not affect permanent hypoparathyroidism. A study by Song *et al*. showed that during total thyroidectomy, preserving at least one parathyroid gland with an intact blood supply appeared to be sufficient to prevent permanent hypoparathyroidism when autotransplantation was not performed.[2] Yet, even if the single preserved parathyroid appears to be viable, it may become non-functioning, leading to post-operative hypoparathyroidism. Paek *et al*. found that lack of experience was a statistically significant risk factor for permanent hypoparathyroidism on multivariate analysis,[3] and this point should be kept in mind during post-graduate training.

Various studies have shown that estimation of post-operative parathyroid hormone (PTH) levels on the day following a total thyroidectomy is an effective strategy to detect hypoparathyroidism, and that a low PTH level on day 1 is associated with a high risk of permanent hypoparathyroidism.[4] However, intra-operative PTH levels are not monitored routinely in thyroid surgery, although they are used widely during parathyroidectomy as an indicator of parathyroid gland function. Quiros *et al*. studied the use of intra-operative PTH levels as a predictive factor for post-operative hypoparathyroidism and found that an intra-operative PTH level of less than 10 pg/ml at closure was a strong predictor.[5] The authors suggested that these patients should be placed on vitamin D supplementation after surgery to avoid anticipated symptomatic hypocalcaemia.

Lastly, we would like to add a few words on the use of pre-operative serum vitamin D levels as a predictive factor for post-operative hypocalcaemia. A study by Tripathi *et al*., published in 2014, found that pre-operative serum vitamin D levels have a positive correlation with serum calcium levels in the early post-operative period.[6] The study also showed that patients with serum vitamin D levels of less than 20 ng/ml were likely to develop early post-operative hypocalcaemia. Hence, it might be worthwhile for surgeons to consider the use of pre-operative serum vitamin D levels and intra-operative PTH levels as predictive factors for post-operative hypoparathyroidism in patients undergoing thyroid surgery.

P KARTHIKEYAN
D T PULIMOOTTIL
Department of Otorhinolaryngology and Head and Neck Surgery, Mahatma Gandhi Medical College and Research Institute, Sri Balaji Vidyapeeth University, Pondicherry, India

### References

1 Hone RW, Tikka T, Kaleva AI, Hoey A, Alexander V, Balfour A *et al*. Analysis of the incidence and factors predictive of inadvertent parathyroidectomy during thyroid surgery. *J Laryngol Otol* 2016;**130**:669–73
2 Song CM, Jung JH, Ji YB, Min HJ, Ahn YH, Tae K. Relationship between hypoparathyroidism and the number of parathyroid glands preserved during parathyroidectomy. *World J Surg Oncol* 2014;**12**:200–9
3 Paek SH, Lee YM, Min SY, Kim SW, Chung KW, Youn YK. Risk factors of hypoparathyroidism following total thyroidectomy for thyroid cancer. *World J Surg* 2013;**37**:94–101
4 Almquist M, Hallgrimsson P, Nordenstrom E, Bergenfelz A. Prediction of permanent hypoparathyroidism after total thyroidectomy. *World J Surg* 2014;**38**:2613–20
5 Quiros RM, Pesce CE, Wilhelm SM, Djuricin G, Prinz RA. Intraoperative parathyroid hormone levels in thyroid surgery are predictive of postoperative hypoparathyroidism and need for vitamin D supplementation. *Am J Surg* 2005;**189**:306–9
6 Tripathi M, Karwasra RK, Parshad S. Effect of preoperative vitamin D deficiency on postoperative hypocalcemia after thyroid surgery. *Thyroid Res* 2014;**7**:8

*The Journal of Laryngology & Otology (2016)*, ***130***, *975–976*.
© JLO (1984) Limited, 2016
doi:10.1017/S0022215116008951

### *Authors' reply*

Dear Editors,

The authors would like to thank Prof K Padmanabhan and Dr D Pulimoottil for their interest and comments in relation to our article[1] and the *Journal of Laryngology & Otology* for the chance to respond. Our study aimed to address factors that may be associated with parathyroid removal, rather than directly investigating the effect of incidental parathyroidectomy on post-operative hypocalcaemia.

The authors appreciate that preservation of the parathyroid glands is likely to influence calcium levels; however, the cause of post-operative hypocalcaemia is multifactorial. Furthermore, the theory that parathyroid injury or devascularisation leads to hypocalcaemia cannot be reliably assessed based on review of histological specimens. The study by Song *et al*. showed a statistically significant increase in transient hypocalcaemia following incidental parathyroidectomy on multivariate analysis,[2] and is supported by other literature.[3,4] However, other studies have not found an association between inadvertent parathyroidectomy and hypocalcaemia.[5–8] A systematic review and meta-analysis may help to develop understanding of the relationship between incidental parathyroidectomy and hypocalcaemia.

All surgeons in our study were in the first half of their careers and routinely supervised training surgeons. Surgical experience is a well-recognised factor affecting surgical outcomes and this should be considered when assessing any post-operative complication.

Intra-operative and early post-operative serum parathyroid hormone (PTH) levels are an established but expensive (although potentially cost-effective) method of attempting to predict post-operative hypocalcaemia following total or completion thyroidectomy. Low levels may encourage early calcium supplementation to prevent hypocalcaemia.[9–13] In the UK, rapid PTH measurement is not routinely available in many centres, and therefore is not recommended by the

British Thyroid Association or British Association of Endocrine and Thyroid Surgeons.

The study by Tripathi *et al*. shows an association between low vitamin D levels and post-operative hypocalcaemia.[14] Indeed, there are high levels of vitamin D deficiency in the UK, and a recent UK government commission report suggested all women in the UK should take a daily 10 μg supplementation. Hence, there may be a potential role for vitamin D supplementation when preparing patients for thyroid surgery.

R W A HONE
I J NIXON
ENT Department, William Harvey Hospital, Ashford, UK

## References

1 Hone RW, Tikka T, Kaleva AI, Hoey A, Alexander V, Balfour A *et al*. Analysis of the incidence and factors predictive of inadvertent parathyroidectomy during thyroid surgery. *J Laryngol Otol* 2016;**130**:669–73
2 Song CM, Jung JH, Ji YB, Min HJ, Ahn YH, Tae K. Relationship between hypoparathyroidism and the number of parathyroid glands preserved during parathyroidectomy. *World J Surg Oncol* 2014;**12**:200–9
3 Khairy GA, Al-Saif A. Incidental parathyroidectomy during thyroid resection: incidence, risk factors, and outcome. *Ann Saudi Med* 2011;**31**:274–8
4 Sippel RS, Ozgul O, Hartig GK, Mack EA, Chen H. Risks and consequences of incidental parathyroidectomy during thyroid resection. *ANZ J Surg* 2007;**77**:33–6
5 Yazici P, Bozkurt E, Citgez B, Kaya C, Mihmanli M, Uludag M. Incidental parathyroidectomy as a cause of postoperative hypocalcemia after thyroid surgery: reality or illusion? *Minerva Chir* 2014;**69**:315–20
6 Lin DT, Patel SG, Shaha AR, Singh B, Shah JP. Incidence of inadvertent parathyroid removal during thyroidectomy. *Laryngoscope* 2002;**112**:608–11
7 Sasson A, Pingpank JF Jr, Wetherington R, Hanlon A, Ridge J. Incidental parathyroidectomy during thyroid surgery does not cause transient symptomatic hypocalcemia. *Arch Otolaryngol Head Neck Surg* 2001;**127**:304–8
8 Gourgiotis S, Moustafellos P, Dimopoulos N, Papaxoinis G, Baratsis S, Hadjiyannakis E. Inadvertent parathyroidectomy during thyroid surgery: the incidence of a complication of thyroidectomy. *Langenbecks Arch Surg* 2006;**391**:557–60
9 Payne RJ, Tewfik MA, Hier MP, Tamilia M, Mac Namara E, Young J *et al*. Benefits resulting from 1- and 6-hour parathyroid hormone and calcium levels after thyroidectomy. *Otolaryngol Head Neck Surg* 2005;**133**:386–90
10 Pisanu A, Saba A, Coghe F, Uccheddu A. Early prediction of hypocalcemia following total thyroidectomy using combined intact parathyroid hormone and serum calcium measurement. *Langenbecks Arch Surg* 2013;**398**:423–30
11 Raffaelli M, De Crea C, Carrozza C, D'Amato G, Zuppi C, Bellantone R *et al*. Combining early postoperative parathyroid hormone and serum calcium levels allows for an efficacious selective post-thyroidectomy supplementation treatment. *World J Surg* 2012;**36**:1307–13
12 Graff AT, Miller FR, Roehm CE, Prihoda TJ. Predicting hypocalcemia after total thyroidectomy: parathyroid hormone level vs. serial calcium levels. *Ear Nose Throat J* 2010;**89**:462–5
13 Payne RJ, Hier MP, Cote V, Tamilia M, MacNamara E, Black MJ. Postoperative parathyroid hormone levels in conjunction with corrected calcium values as a predictor of post-thyroidectomy hypocalcemia: review of outcomes 1 year after the implementation of a new protocol. *J Otolaryngol* 2005;**34**:323–7
14 Tripathi M, Karwasra RK, Parshad S. Effect of preoperative vitamin D deficiency on postoperative hypocalcemia after thyroid surgery. *Thyroid Res* 2014;**7**:8

https://doi.org/10.1017/S0022215116008951 Published online by Cambridge University Press