Biochemical and hormonal alterations in women who underwent total thyroidectomy.

Kakava K.[1], Tournis S.[2], Papadakis G.[3], Karelas I.[1], Stampouloglou P.[1], Kassi E.[4], Triantafillopoulos I.[2], Karatzas T.[5], Villiotou V.[6], Dogkas N.[6], Sarov P.[1], Tassopoulos G.[1], Petridis N[1].

Head and Neck Surgery[1] , Endocrinology[3] and Biochemistry[6] Department of Metaxa Anticancer Hospital Piraeus, Greece.
Laboratory of Research of the Musculoskeletal System (LRMS) of the School of Medicine, National and Kapodistrian University of Athens, Greece.[2]
Endocrinology Unit of Laiko General Hospital of Athens, Greece.[4]
2nd Propedeutic Surgical Department of National and Kapodistrian University of Athens, Laiko General Hospital of Athens, Greece.[5]

Introduction:

Postsurgical hypoparathyroidism, (postHypoP), is a common complication of total thyroidectomy. We studied the variation of biochemical and hormonal parameters in patients who underwent total thyroidectomy.

Design:

- The study included 106 females of a mean age (±SD) 51.03 (±13.42) years who underwent total thyroidectomy for multinodular goiter.
- We estimated the value of 25(OH)vitD, PTH, CT, adjusted Ca, P, and alkaline phosphatase (Alp)
- In three different time points; preoperatively and in the 1st and 7th postoperative day.

Results:

- The patients were devided in groups, A and B, based on the presence of postHypoP.
- Totally, 67 patients who experienced postHypoP were included in group A and 39 of older age without postHypoP in group B.
- Patients in group A were younger than patients in group B (49.6±14.1 vs 53.3±11 years, p=0.031)
- The presence of parathyroid tissue in biopsy was significantly related to postHypoP (observed in 38.1% in group A vs 14.7% in goup B, p= 0.016)
- There were no statistical significant difference between the mean values of preoperative 25(OH)vitD, preoperative PTH and adjusted Ca (p>0.05)
- In the 1st postoperative day group A had lower mean value of adjusted Ca (8.29±0.43 vs 9.34±0.41 mg/dl, p=0.023).
- From the ROC curve, the best cut-off point of PTH in the 1st postoperative day that differentiated patients who developed postHypoP from those who did not was 13.45 pg/ml with sensitivity of 77% and specificity of 54%.(Area under the curve = 0.71, 95% CI=0.61-0.81, p<0.001).

Conclusion:

In patients after total thyroidectomy a PTH value ≤13.4 pg/ml the 1st postoperative day and the presence of parathyroid tissue in biopsy are positive related to postHypoP.

References:

1.Jens Bollerslev et al:European Society of Endocrinology Clinical Guideline: Treatment of chronic hypoparathyroidism in adults, European Journal of Endocrinology (2015) 173, G1–G20.
2.Shoback D: Clinical practice. Hypoparathyroidism. N Engl J Med 359(4): 391-403, 2008.
3.Goncalves Filho J et al:Surgical complications after thyroid surgery performed in a cancer hospital. Otolaryngol Head Neck Surg 132(3): 490-494, 2005.
4.Ozogul B et al.: Factors affecting hypocalcaemia following total thyroidectomy: a prospective study. Eurasian J Med 46(1): 15-21, 2014.
5.Amir A et al.: Preoperative serum calcium levels as an indicator of postthyroidectomy hypocalcemia. J Otolaryngol Head Neck Surg 39(6): 654-658,2010.
6.Erbil Y et al: Predictive value of age and serum parathormone and vitamin d3 levels for postoperative hypocalcemia after total thyroidectomy for nontoxic multinodular goiter. Arch Surg 142(12): 1182-1187, 2007.
7.Erbil Y et al.:The impact of age, vitamin D(3) level, and incidental parathyroidectomy on postoperative hypocalcemia after total or near total thyroidectomy. Am J Surg 197(4): 439-446, 2009.
8.Chapman DB et al.:Parathyroid hormone early percent change: an individualized approach to predict postthyroidectomy hypocalcemia. Am J Otolaryngol 33(2): 216-220, 2012.
9.Ritter K et al.:Hypoparathyroidism after total thyroidectomy: incidence and resolution. J Surg Res 197(2): 348-353, 2015.
10.Kalyoncu D et al.:Analysis of the factors that have an effect on hypocalcemia following thyroidectomy. Ulus Cerrahi Derg 29(4): 171 176, 2013.
11.Bilezikian JP et al.: Hypoparathyroidism in the adult: epidemiology, diagnosis, pathophysiology,target-organ involvement, treatment, and challenges for future research. J Bone Miner Res 26(10): 2317-2337,2011.
12.Al-Dhahri SF et al.: Factors predicting post-thyroidectomy hypoparathyroidism recovery. World J Surg 38(9): 2304-2310, 2014.

Table 1.**Comparison of laboratory parameters before and after total thyroidectomy.**

day	preoperatively	1st postoperative	7th postoperative
CT (pg/ml)	**4.27±1.8**	**4.80±3.2 (p<0.001)**	**3.2±1.5 (p<0.001)**
PTH (pg/ml)	**2912±14.08**	**16.35±11.82 (p<0.001)**	**16.05±12.15 (p<0.001)**
Ca (mg/dl)	**9.51±0.39**	**8.62±0.56 (p<0.001)**	**9.77±0.71 (p=0.001)**
P (mg/dl)	**3.49±0.52**	**3.91±0.71 (p<0.001)**	**3.92±0.72 (p<0.001)**
Creatinine (mg/dl)	**0.69±0.09**	**0.68±0.10**	**0.70±0.99**

Table 2. **Comparison of laboratory parameters in patients with, (Group A), and without postHypoP, (Group B).**

Parameter	Group A (n=67)	Group B (n=39)	p-value
Age (years)	49.6±14.4	53.3±11	**0.031**
BMI (kg/ m^2)	27.83±5.34	28.60±6.17	Not Significant (NS)
Pack-years	7.7±18.83	10±14.33	NS
25(OH)vitD (ng/ml)	17.09±7.87	21.90±10.34	NS
Parathyroid tissue in biopsy	38.1%	14.7%	**0.016**
Not malignancy in biopsy	47.6%	64.7%	NS
Thyroiditis	36.5%	26.5%	NS
Preoperatively			
PTH (pg/ml)	27.73±13.65	32.46±14.39	NS
Creatinine (m/dl)	0.68±0.10	0.69±0.08	NS
Alp (mg/dl)	64.31±20.63	74.56±21.57	NS
Adjusted Ca (mg/dl)	9.04±0.32	9.26±0.32	NS
P (mg/dl)	3.47±0.55	3.52±0.46	NS
CT (pg/ml)	4.27±1.54	4.29±2.20	NS
1st postoperative day			
PTH (pg/ml)	13.86+11.95	20.81±10.30	NS
Creatinine (mg/dl)	0.69+0.11	0.67±0.08	NS
Alp (mg/dl)	59.16±18.75	67.89±22.12	NS
Adjusted Ca (mg/dl)	8.29±0.43	9.03±0.32	**0.023**
P (mg/dl)	4.09±0.68	3.5±0.63	NS
CT (pg/ml)	4.97±3.78	4.48±2.13	NS
7th postoperative day			
PTH (pg/ml)	12.31±10.95	22.89±12.31	NS
Creatinine (mg/dl)	0.70±0.10	0.70±0.09	NS
Alp (mg/dl)	71.04±24.19	78.15±20.53	NS
Adjusted Ca (mg/dl)	9.48±0.75	9.34±0.41	**0.006**
P (mg/dl)	4.10±0.74	3.6±0.58	NS
CT (pg/ml)	3.39±1.59	2.94±1.42	NS