Scholars Academic Journal of Biosciences
Abbreviated Key Title: Sch Acad J Biosci
ISSN 2347-9515 (Print) | ISSN 2321-6883 (Online)
Journal homepage: https://saspublishers.com
NLM ID:101629416
OPEN ACCESS
Biology

Post-total Thyroidectomy Phosphocalcic Disorders at the Yalgado OUEDRAOGO University Hospital Center

Mamane Daouda Aminata[1*], Moumptala Salibi Rachida[2], Kouraogo Arnaud[3], Sakande Jean[4]

[1]Medical Biology Laboratory, CERMES, Niger
[2]Medical Biology Laboratory, Zinder National Hospital
[3]Nazi Boni University of Bobo Dioulasso
[4]Faculty of Medicine, Joseph Ki-Zerbo University (UJKZ) of Ouagadougou

DOI: https://doi.org/10.36347/sajb.2025.v13i11.007 | **Received:** 17.09.2025 | **Accepted:** 28.10.2025 | **Published:** 19.11.2025

***Corresponding author:** Mamane Daouda Aminata
Medical Biology Laboratory, CERMES, Niger

Abstract | **Original Research Article**

Post-total thyroidectomy phosphocalcic disorders (PCDs) are the most feared complication of total thyroidectomy. In some cases, it may require lifelong replacement therapy and follow-up. The objective of this study was to determine the prevalence and risk factors of phosphocalcic disorders in patients undergoing total thyroidectomy at the Yalgado Ouédraogo University Hospital Center. This was a prospective, cross-sectional study conducted from March 1 to September 30, 2021, in the ENT and Head and Neck Surgery (HNS) department. The sample size was composed of 30 patients who underwent total thyroidectomy. The mean age of our patients was 48 years, with a predominance of female subjects (90%). The mean serum calcium level was 2.19 mmol/L. For phosphoremia, the mean was 1.27 mmol/L. The frequency of post-total thyroidectomy hypocalcemia was 30%, of which 88.89% was permanent, requiring calcium supplementation, and 11.11% was transient. Among the patients presenting with hypocalcemia, all (100%) had clinical manifestations such as cramps and/or paresthesia. The study demonstrates that permanent post-thyroidectomy hypocalcemia was relatively high in Burkina Faso, highlighting the need for rapid diagnosis and specific management of patients after total thyroidectomy.

Keywords: Phosphocalcic Disorders – Total Thyroidectomy – CHU YO-BF.

INTRODUCTION

Hypoparathyroidism is defined as the inability of the parathyroid glands to maintain a normal level of ionized calcium in the plasma under physiological conditions (Avioli 1974). Thyroid surgery is the most frequent cause of its occurrence. Indeed, regardless of its indication, it carries a risk of complications, one of the most formidable of which affects the parathyroid glands, which maintain close relationships with the thyroid gland (Fanget *et al.*,, 2020).The primary reduction or absence of parathyroid hormone (PTH) secretion following total thyroidectomy results in the occurrence of transient hypocalcemia in most cases, due to simple injury to the parathyroid glands, or permanent hypocalcemia secondary to trauma or devascularization of the parathyroids. It can be profound, but is reversible in many cases. Post-thyroidectomy hypocalcemia can lead to serious neuromuscular, renal, cardiovascular, and digestive complications that require long-term, and sometimes lifelong, medical management. In the literature, the incidence of post-thyroidectomy hypoparathyroidism varies: a study conducted in France, in Lyon (Fanget *et al.*,, 2020), reported 64 cases of hypocalcemia out of 403 patients who underwent total thyroidectomy, representing 15.8%, of which 7 patients progressed to a permanent form (1.7%) (Fanget *et al.*,, 2020).In Tunisia, a study conducted by Lachkhem *et al.*,, reported an 11.06% rate of postoperative hypocalcemia out of a total of 488 cases of total thyroidectomy, with postoperative hypocalcemia found in 54 patients, a prevalence of 11.06 % (Lachkhem *et al.*,, 2010). More recently, in 2020, in Burkina Faso, Bacharou reported in a thesis a prevalence of 28.8% for postoperative hypocalcemia among 104 patients who underwent total thyroidectomy, with about thirty cases of post-thyroidectomy hypocalcemia at the CHU YO, or a prevalence of 28.8% (Bacharou. A 2020). The objective of this study was to determine the prevalence, and the socio-demographic and clinical factors associated with phosphocalcic disorders in patients undergoing total thyroidectomy at the Yalgado Ouédraogo University

Hospital Center (CHU-YO) in Ouagadougou, Burkina Faso. The ultimate goal of this work is to propose a better management strategy for post-total thyroidectomy phosphocalcic disorders in Burkina Faso.

1. MATERIALS METHODS

The ENT and Head and Neck Surgery (HNS) department of the Yalgado Ouédraogo University Hospital Center (CHU YO) served as the setting for patient recruitment. The measurement of the different biological parameters was carried out in the biochemistry laboratory of the said hospital. This was a prospective, cross-sectional, descriptive study that took place from March 1 to September 30, 2021.The study population consisted of all patients who underwent a total thyroidectomy in the ENT and Head and Neck Surgery (HNS) department of the CHU YO.

Inclusion Criteria

All patients who underwent a total thyroidectomy in the ENT HNS department of the CHU YO with postoperative serum calcium measurement between July 04, 2018, and March 01, 2021, during the study period, were included in this work.

Non-Inclusion Criteria

Patients admitted to the department for a parathyroid pathology, patients who underwent a lobo isthmectomy (partial thyroidectomy), and patients who did not benefit from postoperative calcium workups were not included in this study.

Sample Collection, Pre-treatment, and Biological Analyses

For the included patients, whole blood was collected by venipuncture in the antecubital fossa without a tourniquet, in a plain tube (red cap), in the morning from fasting participants. The collected blood samples were centrifuged at 3500 revolutions per minute for 5 minutes to collect the serum. The collected sera were aliquoted into 1.5 mL cryotubes, previously identified, then frozen and stored at 0 °C for a maximum of one week. The biological parameters analyzed were calcemia, phosphoremia, and proteinemia. The biological analysis was performed using the spectrophotometry principle on the Roche Cobas 6000 automated analyzer.

Data Processing and Analysis

Data collection was carried out from patients using an individual form. All statistical analyses were performed using STATA 16 software. Quantitative variables (calcemia, phosphoremia, proteinemia) were described using means, standard deviations, and extremes (ranges). Qualitative variables (sex, hypocalcemia, etc.) were described using counts (frequencies) and percentages. Bivariate and multivariate analyses were performed to determine the risk factors for postoperative hypocalcemia. The significance level was set at $p<0.05$ for all variables.

2. RESULTS

Socio-demographic and Professional Characteristics of the Patients

A total of 30 patients were included. Their mean age was 48.4±13.05 years, with a range of 16 to 67 years. The most represented age group was 55–64 years, accounting for 30%. Female patients were the most represented, with a sex ratio (Male/Female) of 0.11.

Table I: Socio-demographic and Professional Characteristics

Paramètres	Effective	Percentage
Age years (m±SD)	48,4 ±13,05	
Age years(min/max)	16 / 67	
Gender		
Male	03	10
Female	27	90
Sexe ratio	11,11	

Phosphocalcic Profile

The mean calcium value was slightly below the normal range, at 2.19 ± 0.17 mmol/L. For phosphoremia and proteinemia, we recorded normal mean values, with 1.27 ± 0.21 mmol/L for phosphoremia and 73.53 ±7.24 mmol/L for proteinemia, respectively (Table II).

Table II: Distribution of the Phosphocalcic Profile

Parameters	Effective	Mean	Standard deviation	Minimum	Maximum
Calcémia	30	2,19	0,17	1,72	2,47
Phosphorémia	30	1,27	0,21	0,76	1,72
Protidémia	30	73,53	7,24	51,6	83,9

Frequency and Evolution of Hypocalcemia

Thirty percent (30%) of the patients had hypocalcemia (Figure 1).

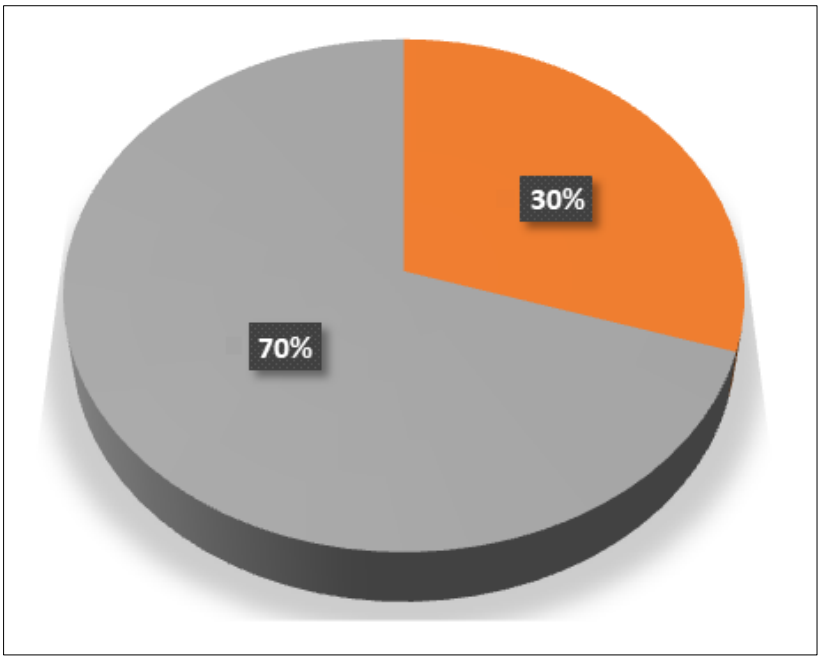

Figure 1: Frequency of Hypocalcemia

Table III: Distribution of Patients According to Age, BMI, Clinical Signs, and Medical Follow-up

Parameters	**Effective hypocalcémia** n=09, 100%	**Effective Normocalcémia** n=21	***p-value***
Age			
16-24ans		01	
25-34ans		04	
35-44 ans	03(33,33)	02	0,126
45-54ans	01(11,11)	07	
55-64ans	03(33,33)	06	
65ans +	02(22,22)	01	
BMI (Body Mass Index)			
<25	04(44,44)	08	0,924
25-30	03(33,33)	07	
>30	02(22,22)	06	
Clinical signs			
Yes	09(100)	07	0,001
No	00	14	
Cramps	04(44,44)	05	0,258
Paresthesias	07(77,78)	04	0,002
Medical follow-up			
Yes	05(55,56)	15	0,398
No	04(44,44)	06	

Here was no statistically significant link between the occurrence of post-total thyroidectomy hypocalcemia and BMI (p=0.924), patient age (p=0.126), or medical follow-up (p=0.398). However, post-total thyroidectomy hypocalcemia was significantly associated with the presence of paresthesia (p=0.002).

Evolution of Hypocalcemia

Figure 1 shows that out of a total of 15 cases of hypocalcemia recorded immediately postoperatively, 9 (30%) were confirmed by our control (Figure 2). Among the 9 cases of hypocalcemia, 88.89% progressed to a permanent form of hypocalcemia, while 11.11% experienced a transient form.

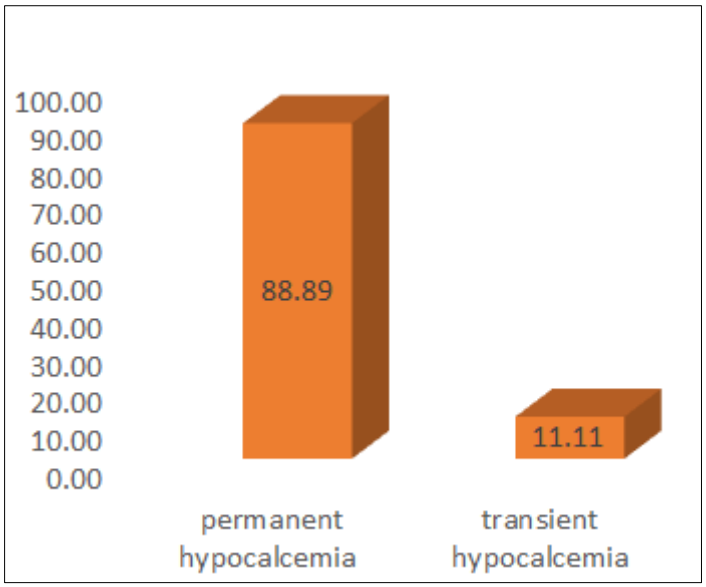

Figure 1: Evolution of Hypocalcemia

3. DISCUSSION

The mean age of our study population was 48 years. Our findings are consistent with those in the literature (Halwani *et al.*, 2020), (Fanget *et al.*, 2020), (Assoumou M. 2019), (Ait taleb O. 2017), (Blegole O. *et al.*, 2020), (Bacharou. A 2020), which placed the mean age of patients suffering from thyroid disorders between 30 and 50 years. The most represented age group was 55 to 64 years. Our results are similar to those of Nanko D. *et al.*, (Nanko D. *et al.*, 2021) in Mali, for whom the most represented age group was 40-60 years, and to those of Bacharou A. in Burkina Faso, with the 50–60-year age group. Conversely, similar to the study conducted by Ait taleb O. (Ait taleb O. 2017), there was no relationship between the patient's age and the occurrence of post-total thyroidectomy hypocalcemia (p=0.742).

In our study, we observed a clear female predominance of 90%, with a sex ratio of 1 male for every 9 females. This trend, noted in the various reviews consulted (Kotisso *et al.*, 2004), (Halwani *et al.*, 2020), (Assoumou M. 2019), (Ait taleb O. 2017), (Nanko D. *et al.*, 2021), is certainly linked to the high frequency of goiter disease in women, with a sex ratio of 1 male for 3 to 6 females according to the authors.

Hypocalcemia is a relatively common complication of thyroid surgery. In our study, its frequency was 30%. In the literature (Kotisso *et al.*, 2004), (Taneri *et al.*, 2005) (Nanko D. *et al.*, 2021), (Bacharou. A 2020), the frequency of post-total thyroidectomy hypocalcemia was extremely variable from one author to another (9.25% to 41.18%). Different factors can explain these variations, such as the size of the study population, the definition of hypocalcemia, the type of thyroid pathology, as well as the surgical technique adopted (Lachkhem *et al.*, 2010) (Kotisso *et al.*, 2004) (Lin *et al.*, 2012) (Bacharou. A 2020).

According to our study, BMI was not a predictive factor for the occurrence of post-total thyroidectomy hypocalcemia (p=0.924). Our results are inconsistent with those of Ait Taleb O., who concluded from his study that "<<the higher the patient's BMI, the greater the risk of developing hypocalcemia>>."Data in the literature remain contradictory on this subject: in the series by Jeong Nam Cho *et al.*,, (Cho *et al.*,, 2016) and Dedivitis *et al.*,, (Dedivitis *et al.*,, 2010), BMI was not a predictive factor for the occurrence of postoperative hypocalcemia; however, Yihan Lin *et al.*,, (Lin *et al.*,, 2012) found that a BMI exceeding 25 kg/m2 was a factor for the occurrence of postoperative hypocalcemia. Clinical In the literature (Dedivitis *et al.*,, 2010) (Moore *et al.*,, 2001) (Cooper et Gittoes 2008), it is noted that post-total thyroidectomy hypocalcemia is not necessarily symptomatic, especially in the first few postoperative days, hence the importance of measuring calcemia during the first three days after the operation to detect it as early as possible. Thus, Lachkhem *et al.*, (Lachkhem *et al.*, 2010) stated that there is no parallelism between biology and clinical signs, as more than 50% of their asymptomatic patients had abnormal biological results. In our study, a clinical symptomatology was found in all recorded hypocalcemia cases; there was therefore a relationship between hypocalcemia and clinical manifestations (p=0.001). The latter manifested as cramps in 44.44% of cases and as paresthesia in 77.78% of cases. Our results are consistent with those of several reviews (Murphy and Williams 2009) (Shoback 2008) which defined the most common symptoms of hypocalcemia as: paresthesias and cramps.

In our study, out of the 15 patients who suffered from immediate postoperative hypocalcemia, 6 recovered normal calcium levels, representing a favorable outcome in 40% of cases. In several reviews (Lachkhem *et al.*, 2010) (Dedivitis *et al.*, 2010) (Bacharou. A 2020), this evolution was much more

favorable, with percentages ranging between 74% and 96.7%. Several factors can explain the difference between their results and ours, including: medical follow-up the standards established by laboratories for calcium level measurement the difference in the definition of the transient or permanent nature of hypocalcemia.

4. CONCLUSION

Post-total thyroidectomy hypocalcemia is the most frequent complication of thyroidectomy. It is most often transient and asymptomatic but can be very severe and irreversible. In our study, the frequency of post-thyroidectomy hypocalcemia was 30%. Only 40% of the affected patients recovered normal calcium levels. This complication therefore remains a concern, highlighting the need for rapid diagnosis and specific management. In this regard, the implementation of an immediate management protocol in ENT followed by a systematic referral to the endocrinologist for treatment would be beneficial. The latter could then collaborate easily with the biologist for the follow-up of both thyroid hormonal balance and calcium levels.

RÉFÉRENCES

- Ait taleb O. 2017. "Predictive factors for post-thyroidectomy hypoparathyroidism." Thesis : Mohamed V University Rabat.
- Assoumou M. 2019 «Epidemiological and anatomo-pathological aspects of thyroid pathologies in Mali. »Thesis, University of Sciences, Techniques and Technologies of Bamako.
- Avioli, L. V. 1974. « The Therapeutic Approach to Hypoparathyroidism ». The American Journal of Medicine 57 (1): 34-42. https://doi.org/10.1016/0002-9343(74)90765-7.
- Bacharou. A. 2020. « Post-total Thyroidectomy Hypocalcemia in the ENT and Head and Neck Surgery Department (ORL CCF) of Yalgado Ouédraogo University Hospital: Epidemiological, Diagnostic, Therapeutic, and Evolutionary Aspects». Thesis, UJK UFR/SDS.
- Blegole O. and al. 2020. « Graves' Disease and Post-Thyroidectomy Hypocalcemia in the General, Digestive, and Endocrine Surgery Department of the Treichville University Hospital Center (CHU de Treichville) ». 2020 (Ivory Coast).
- Cho, Jeong Nam, Won Seo Park, et Sun Young Min. 2016. « Predictors and Risk Factors of Hypoparathyroidism after Total Thyroidectomy ». International Journal of Surgery (London, England) 34 (October): 47-52. https://doi.org/10.1016/j.ijsu.2016.08.019.
- Cooper, Mark S., et Neil J. L. Gittoes. 2008. « Diagnosis and Management of Hypocalcemia ». BMJ (Clinical Research Ed.) 336 (7656): 1298-302. https://doi.org/10.1136/bmj.39582.589433.BE.
- Dedivitis, Rogério Aparecido, Elio Gilberto Pfuetzenreiter, Carlos Eduardo Molinari Nardi, et Emmanuel Casotti Duque de Barbara. 2010. « Prospective Study of Clinical and Laboratorial Hypocalcemia after Thyroid Surgery ». Brazilian Journal of Otorhinolaryngology 76 (1): 71-77. https://doi.org/10.1590/S1808-86942010000100012.
- Fanget, F., M. Kalifi, S. Bonnafous, A. Lintis, L. Maillard, et J. C. Lifante. 2020. « Medico-economic impact of post-thyroidectomy hypoparathyroidism. » Annals of Endocrinology Congress of the French Society of Endocrinology, vol. 81 (4): 229. https://doi.org/10.1016/j.ando.2020.07.240.
- Halwani, Chiraz, Senda Turki, et Khémaies Akkari. 2020. « Predictive factors for post-total thyroidectomy hypocalcemia. »LA TUNISIE MEDICALE 98
- Kotisso, Berhanu, Tessema Ersumo, Adem Ali, et Alemayehu Wassie. 2004. « Thyroid Disease in Tikur Anbessa Hospital: A Five-Year Review ». Ethiopian Medical Journal 42 (3): 205-9.
- Lachkhem, A, H Ouertani, D Belhassen, A Chorfa, S Touati, et S Gritli. 2010. « Post-thyroidectomy Hypocalcemia» Journal Tunisien d'ORL et de Chirurgie Cervico-Faciale 21 (1).https://doi.org/10.4314/jtdorl.v21i1.57954.
- Lin, Yihan, Hayley L. Ross, Christopher D. Raeburn, *et al.*, 2012. « Vitamin D Deficiency Does Not Increase the Rate of Postoperative Hypocalcemia after Thyroidectomy ». American Journal of Surgery 204 (6): 888-93; discussion 893-894. https://doi.org/10.1016/j.amjsurg.2012.10.001.
- Moore, C., H. Lampe, et S. Agrawal. 2001. « Predictability of Hypocalcemia Using Early Postoperative Serum Calcium Levels ». The Journal of Otolaryngology 30 (5): 266-70. https://doi.org/10.2310/7070.2001.19512.
- Murphy, Elaine, et Graham R. Williams. 2009. « Hypocalcemia ». Medicine 37 (9): 465-68. https://doi.org/10.1016/j.mpmed.2009.06.003.
- Nanko D. *et al.,* 2021. « Clinico-Biological Evolution of Hyperthyroid Goiters After Total Thyroidectomy in The Department of Endocrinology-Internal Medicine at Mali Hospital, Bamako, Mali ». SAS Journal of Medicine. (Mali). DOI: 10.36347/sasjm. 2021.v07i09.008.
- Shoback, Dolores. 2008. « Clinical Practice. Hypoparathyroidism ». The New England Journal of Medicine 359 (4): 391-403. https://doi.org/10.1056/NEJMcp0803050.
- Taneri, Ferit, Osman Kurukahvecioglu, Bahadir Ege, *et al.*, 2005. « Prospective Analysis of 518 Cases with Thyroidectomy in Turkey ». Endocrine Regulations 39 (3): 85-90.