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RANDOMIZED CONTROLLED TRIAL STUDY THE FREQUENCY OF POST-OPERATIVE ASYMPTOMATIC HYPOCALCAEMIA AFTER TOTAL THYROIDECTOMY COMPARING SUB-TOTAL THYROIDECTOMY

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Abstract:

Introduction: *Thyroidectomy, being one of the frequently performed operations, has a post-operative hypocalcaemia as a complication that has (0.33%-65%) occurrence rate. The occurrence of hypocalcaemia in both total/sub-total thyroidectomy is evident both biochemically and clinically. The symptoms of hypocalcaemia include facial muscles' twitching, capo-pedal spasms, seizures, and irritability. On the other hand, it can also be asymptomatic completely. It may result in either post-operative or permanent misery for the patient.*

Objective: *The research objective is to compare total thyroidectomy and sub-total thyroidectomy relative to the frequency of post-operative asymptomatic hypocalcaemia among multi-nodular goitre patients.*

Materials and Method: *We conducted this randomized controlled trial study at Allama Iqbal Medical College, Lahore from April 2017 to January 2018.*

Results: *The mean age among the patients of Group-A and Group-B was (30.9 ± 9.6) and (31.59 ± 11) years respectively. We found asymptomatic hypocalcaemia among 35.6% (62) and 17.2% (30) patients of Group-A and Group-B respectively. We found a statistically significant difference between both groups with P-value of 0.000.*

Conclusion: *We found the frequency of AH to be higher significantly after TT comparing to STT. There is no significant relation of AH with gender. The chance of AH development among younger and older age patients was equal after TT or STT.*

Keywords: *Asymptomatic Hypocalcaemia (AH), Total Thyroidectomy (TT), Sub-total Thyroidectomy (STT), MNG, FNAC, and HPE.*

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INTRODUCTION:

Thyroidectomy, being one of the frequently performed operations, has a post-operative hypocalcaemia as a complication that has (0.33%-65%) occurrence rate [1]. The occurrence of hypocalcaemia in both total/sub-total thyroidectomy is evident both biochemically and clinically. The symptoms of hypocalcaemia include facial muscles' twitching, capo-pedal spasms, seizures, and irritability. On the other hand, it can also be asymptomatic completely [2 – 5]. It may result in either post-operative or permanent misery for the patient. It is, therefore, necessary to keep checking a patient's biochemical and clinical profile. It also helps in reducing morbidity/mortality among a Post-thyroidectomy patient. Literature records the rate of temporary and permanent hypocalcaemia after thyroid-surgery raising from (1.6%-50%) and (1.5%-4%) surgeries respectively [6]. Among the causes of hypocalcaemia, there are hungry bone-syndrome (among patients having the metabolic bone disease), calcitonin release (post thyroid gland manipulation), increased urinary-calcium excretion (secondary to surgical stress), and hemodilution (secondary to intravenous fluid administration) [7]. However, most likely, de-vascularization/removal of parathyroid glands and hypo-para-thyroidism due to direct injury cause post-operative hypocalcaemia [7]. Acute/severe hypocalcaemia requires immediate remedial action as it is a medical emergency. Potentially, hypocalcaemia increases the duration of hospital stay. We can reduce the duration of hospital stay by detecting a low level of calcium at the asymptomatic stage [8]. The normal serum level is (8.50-10.50 mg/dl) when it drops below 8 mg/dl, it becomes an evident symptom of hypocalcaemia [8]. If the serum level falls immediately after surgery, it predicts symptomatic hypocalcaemia for later clinical examinations [9]. The above facts show hypocalcaemia requires immediate management, being a medical emergency. Our research purpose is to determine the post-operative AH frequency comparing TT and STT. This will help in reducing the rate of mortality and morbidity, moreover, we will also be able to recommend a better technique out of the above two for future management of the said disease.

AH: Having a level of Serum calcium as 8mg/dl (<2 mmol/l) with no clinical signs shown and hypocalcaemia symptoms 24-hours post-surgery.

MATERIAL AND METHODS:

We conducted this randomized controlled trial study at Allama Iqbal Medical College, Lahore from April 2017 to January 2018. We included patients of both genders, from (14-50) years' age group, and having gone through total/sub-total thyroidectomy. We excluded patients having hypocalcaemia due to systemic disease (Pre/post-operative lactating mother or renal disease) or other reasons and patients with postoperative symptomatic hypocalcaemia following TT or STT.

We took approval from the Institutional Review Board and then took written consent from each patient fulfilling inclusion criteria. We divided patients into two groups, i-e Group-A (TT) and Group-B (STT) through the lottery system. We sent the level of serum calcium to the relevant laboratory before and after 24 hours of surgery. We entered demographic data (gender and age) into pre-designed proforma.

We entered the data using SPSS to analyse it statistically. We presented quantitative variables (age) as mean and standard deviation while used frequency and percentages to present qualitative data (gender, AH). We applied a Chi-square test for the comparison of AH in both groups. We used stratification for age and gender. To check the significance level, we applied the post-stratification chi-square test. We considered P-value of $\leq$ 0.05 as statistically significant.

RESULTS:

We entered all data using SPSS and analyzed it. We took 348 patients with mean (31.2 ± 10.3) years. The mean age among the patients of Group-A and Group-B was (30.94 ± 9.6) and (31.6 ± 11) respectively. The number of male and female patients in Group-A was 32% (56) and 68% (118) and in Group-B were 344% (60) and 66% (114) respectively. The patients of Group-A were 174, and we performed TT among them where we found 35.6% (62) patients with AH. We treated the patients (174) of Group-B with STT and found 17.2% (30) patients with AH. The difference between both groups was statistically significant with P-value of 0.000. After gender stratification, we found AH among 39.3% (22) and 15% (09) male patients of Group-A and Group-B respectively. We found a significant difference between the patients of Group-A comparing to Group-B with (P-value = 0.003). However, we found AH among 33.90% (40) and 18.4% (21) female patients of Group-A and Group-B respectively. We found a significant difference between the patients of Group-A comparing to Group-B with (P-value = 0.010). After age stratification, we found 105, and 101 patients in age-group (18-32) from Group-A and Group-B respectively. We recorded the frequency of AH as 38.10% (40) and 18.8% (19) among the patients of Group-A and Group-B respectively. We found a significant difference in AH

frequency between the patients of Group-A comparing to Group-B with (P-value = 0.003). The number of patients in age-group (33-50) years' age from Group-A and Group-B was 69 and 73 respectively. We recorded the frequency of AH as 31.90% (22) and 15% (11) among the patients of Group-A and Group-B respectively. We found a significant difference in AH frequency between the patients of Group-A comparing to Group-B with (P-value = 0.028). After ASA Grade-I stratification, we found the frequency of AH as 32.2% (30) and 21% (12) among 93 and 57 patients that belonged to Group-A and Group-B respectively. We found an insignificant difference in the frequency of AH between both groups with (P-value = 0.189). Among ASA Grade-II patients, we found the frequency of AH as 39.5% (32) and 15.3% (18) among 81 and 117 patients that belonged to Group-A and Group-B respectively. The proportion of AH was higher in Group-A patients comparing to Group-B with (P-value = 0.000).

Table – I: The mean of Group-A and Group-B patients

Group	Number	Mean	SD
Group - A	174	30.94	9.6
Group - B	174	31.59	11.03
Total	348	31.27	10.33

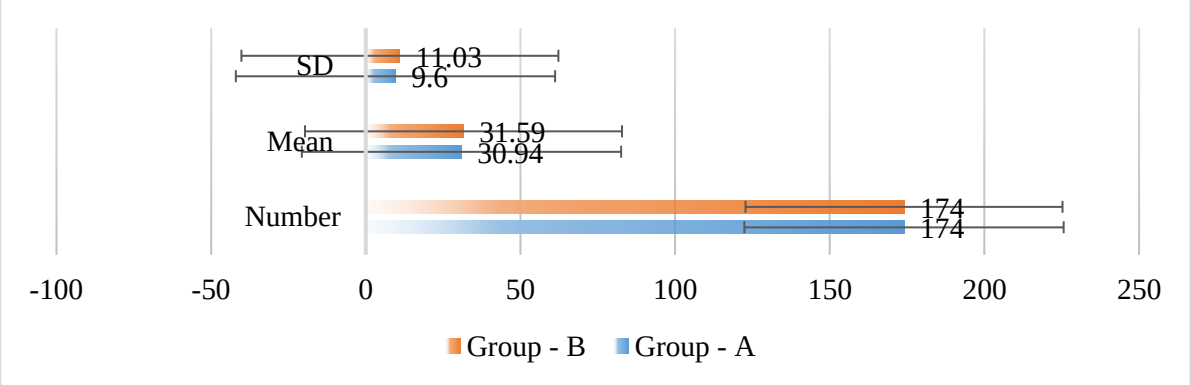


Table – II: Group Wise Gender Distribution

Gender		Number	Percentage
Group - A	Males	56	32
	Females	118	68
Group - B	Males	60	34
	Females	114	66

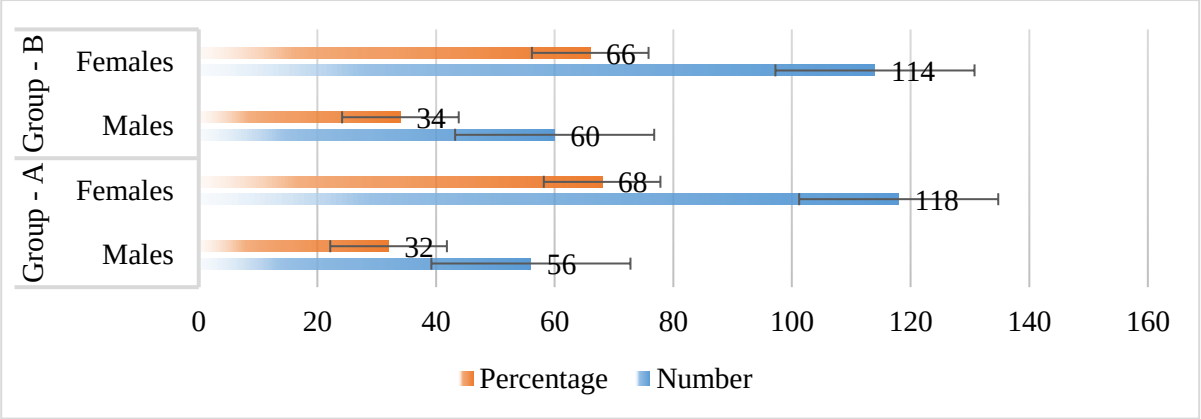


Table – III: AH comparison between Group-A and Group-B

Asymptomatic Hypocalcemia	Yes		No		Total	P-Value
	Number	Percentage	Number	Percentage		
Group - A	62	35.63	112	64.37	174	0.00
Group - B	30	17.24	144	82.76	174	

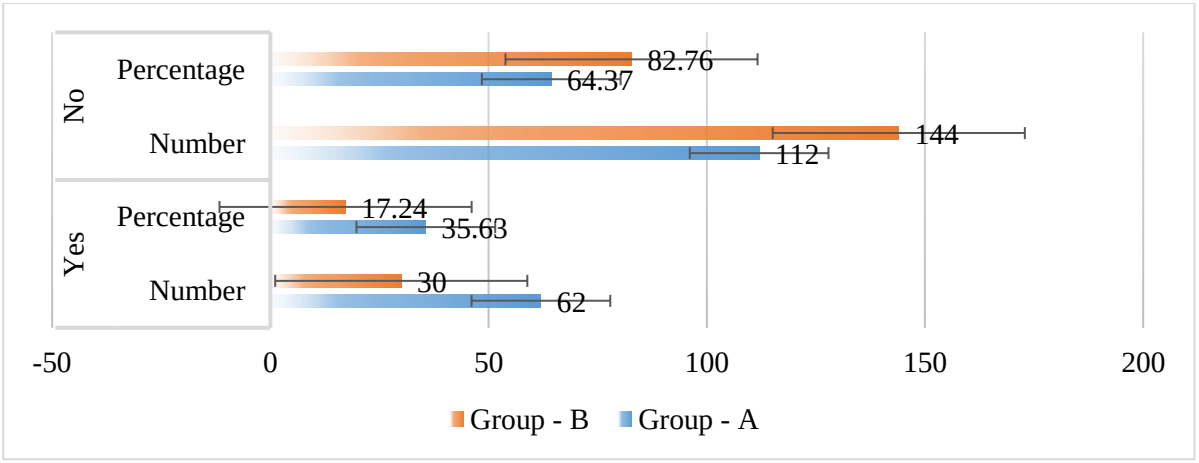


Table – IV: Gender Wise AH Distribution

Asymptomatic Hypocalcemia		Yes		No		Total	P-Value
		Number	Percentage	Number	Percentage		
Males	Group - A	22	39.29	34	60.71	56	0.003
	Group - B	9	15	51	85	60	
Females	Group - A	40	33.9	78	66.1	118	0.028
	Group - B	21	18.42	93	81.58	114	

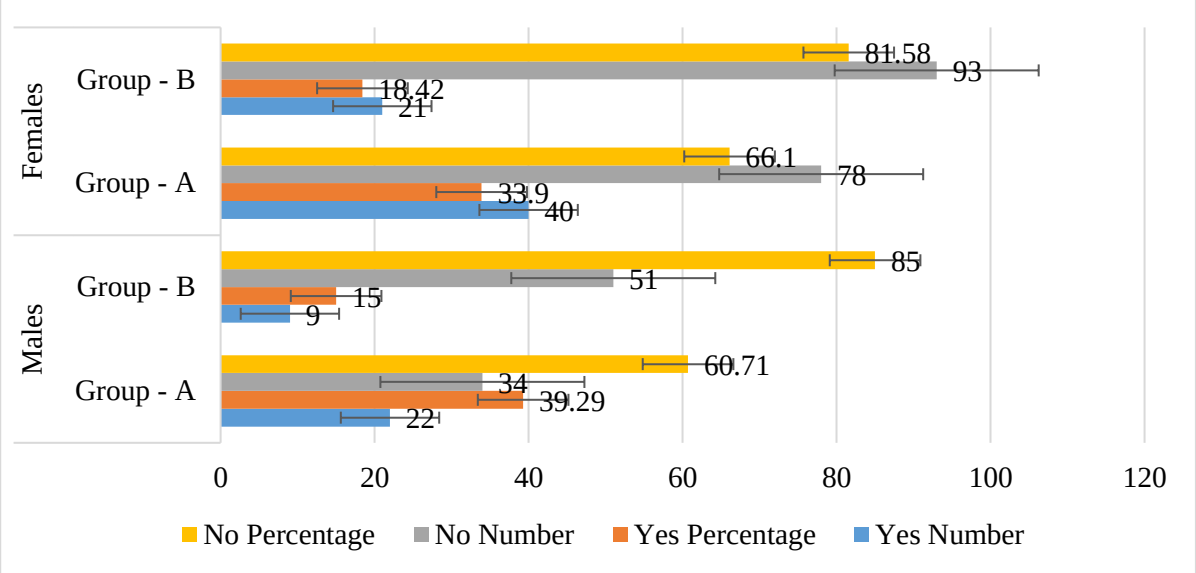


Table – V: Age Stratification

Asymptomatic Hypocalcemia		Yes		No		Total	P-Value
		Number	Percentage	Number	Percentage		
18 - 32 Years	Group - A	40	38.1	65	61.9	105	0.003
	Group - B	19	18.81	82	81.18	101	
33 - 50 Years	Group - A	22	31.89	47	68.11	69	0.028
	Group - B	11	15.07	62	84.93	73	

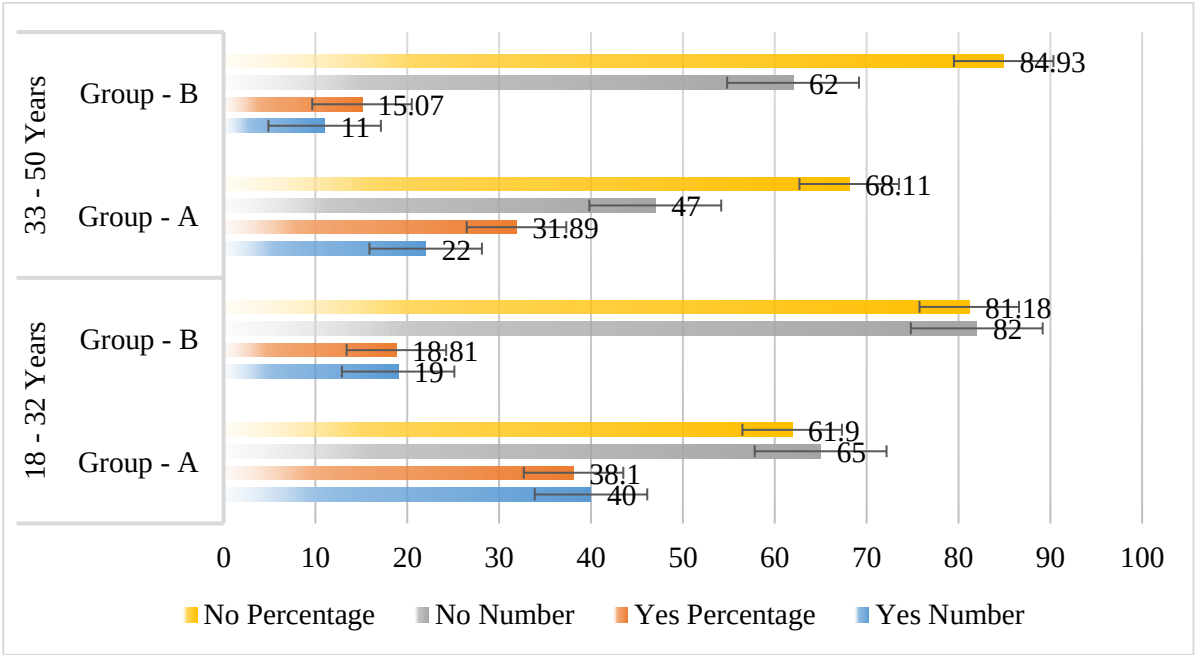
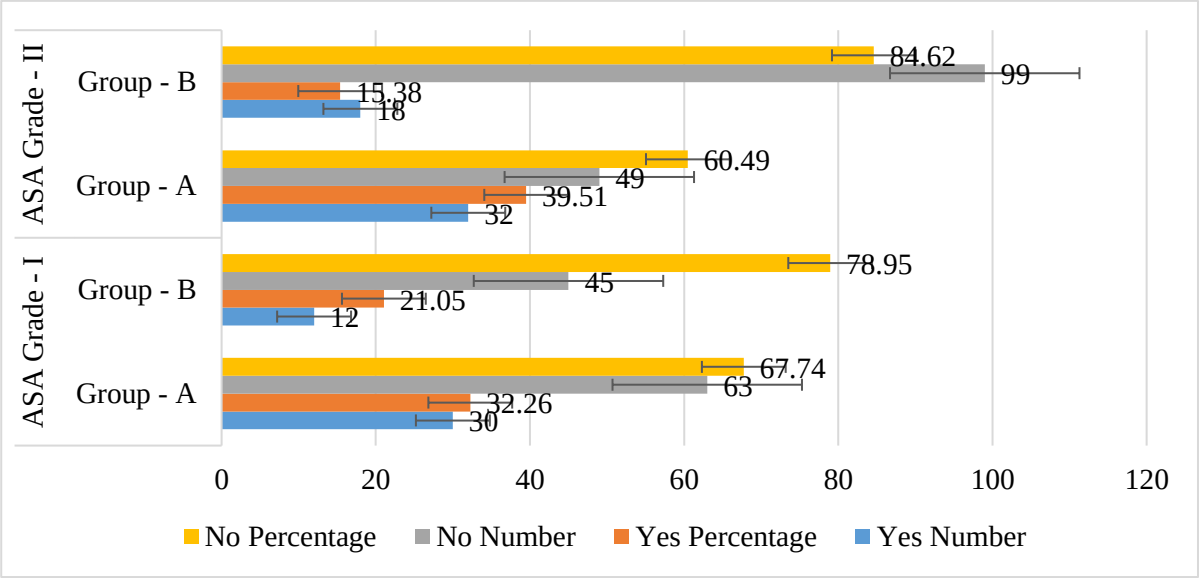


Table – VI: ASA Grades Stratification

Asymptomatic Hypocalcemia		Yes		No		Total	P-Value
		Number	Percentage	Number	Percentage		
ASA Grade - I	Group - A	30	32.26	63	67.74	93	0.189
	Group - B	12	21.05	45	78.95	57	
ASA Grade - II	Group - A	32	39.51	49	60.49	81	0.000
	Group - B	18	15.38	99	84.62	117	



DISCUSSION:

Many factors are involved in the development of post-thyroidectomy hypocalcaemia. Among these factors, there are hungry bone-syndrome (among patients having the metabolic bone disease), calcitonin release (post thyroid gland manipulation), increased urinary-calcium excretion (secondary to surgical stress), and hemodilution (secondary to intravenous fluid administration). However, most likely, de-vascularization/removal of parathyroid glands hypo-para-thyroidism due to direct injury causes post-operative hypocalcaemia [10]. In our study, we found the frequency of AH higher significantly among patients of Group-A (37.50%) comparing to Group-B (15.8%). In a study, Islam MS et al. in Bangladesh took 65 patients to be treated with TT (no age and gender condition) and found 88% of AH frequency which is a higher number comparing to our study [11]. Iqbal J et al. and Malik V et al. found the frequency of AH as 18.80% and 24.1% respectively while treating all the patients through TT [12, 13]. These findings are comparable to our study. In another study, Erbil et al. found 31.20% AH among 130 patients treated with TT and multi-nodular goitre [15]. Lankarani et al. found 19.60% AH among 102 patients treated with STT and multi-nodular goitre [16]. Gentileschi et al. report a 19.2% frequency of AH in his study [17]. The present study recorded AH frequency among the male patients of Group-A and Group-B as 47.3% and 17% respectively while among female patients 39% and 20.2% respectively. Díez et al. observed 21.40% and 35.80% frequency of AH among male and female patients respectively which is comparable to the findings of our study. In our study, we found the difference in AH frequency among young and older age groups significant as (P-value = 0.015). Unalp HR et al. on the other hand, found a significantly higher rate of AH among older age groups [19]. They recorded 41.20% of AH among 34 patients.

CONCLUSION:

The frequency of AH results significantly higher after TT comparing to STT. Both genders can become a victim of AH equally after TT or STT. The chance of AH among younger and older age groups is the same after TT or STT.

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