

# Medial Approach Thyroidectomy for Obese Patients

Nathan Lloyd MD, Spencer Muscelli BS, Emily Sagalow MD, Adrianna Castellanos BS, Robert Wang MD

## Introduction

- Our prior work has found that a medial approach to goiter resection resulted in minimal substernal and deep neck dissection with low morbidity
- Several studies have demonstrated similar outcomes for thyroidectomy in obese patients as compared to patients with BMI <25 when considering rates of complications, including recurrent laryngeal nerve (RLN) injury and hypoparathyroidism. <sup>1,2,3,4,5,6</sup>
- Operative times have previously been shown to be longer in obese patients than in patients with normal BMI<sup>2</sup>

## Approach

- a) Initial division of the medial thyroid tracheal attachments
- b) Identification of the recurrent laryngeal nerve medial-inferiorly or superiorly
- c) Division of the superior thyroid attachments
- The substernal components are then delivered into the superficial paratracheal region of the neck

## Methods

- Data was collected from all cases of total and hemithyroidectomy performed by a single surgeon at our institution from July 2018 to January 2022. The relation between patient size and the risk of recurrent laryngeal nerve (RLN) palsy, hypoparathyroidism and surgical duration were statistically analyzed. Analyses were performed using Fisher's Exact Test and Welch Two Sample t-test in Rstudio v2022.02.2 with a significance level set at 0.05.

Summary of Data Collection:  
Vocal Cord Paresis vs BMI, Height, Weight

BMI	Unintended vocal cord injury	Transient <6 months	Permanent ≥6 months	Lost to follow	Ava. time of transient recovery (days)
<18.5 kg/m <sup>2</sup> (underweight)	1/2 (50%)	1/2 (50%)	0	0	203
18.5-24.9 kg/m <sup>2</sup> (normal)	1/65 (1.54%)	1/65 (1.54%)	0	0	61
25-29.9 kg/m <sup>2</sup> (overweight)	6/99 (6.06%)	3/99 (3.03%)	0	3/99 (3.03%)	86.6
30-34.9 kg/m <sup>2</sup> (obese)	2/49 (4.08%)	1/49 (2.04%)	0	1/49 (2.04%)	186
≥ 35 kg/m <sup>2</sup> (morbidly obese)	3/58 (5.17%)	2/58 (3.45%)	1/58 (1.72%)	0	69

Height	Unintended vocal cord injury	Transient <6 months	Permanent ≥6 months	Lost to follow	Ava. time of transient recovery (days)
≤ 5' 1"	3/70 (4.28%)	1/70 (1.43%)	1/70 (1.43%)	1/70 (1.43%)	76
5' 2"-5' 3"	1/49 (2.04%)	0	0	1/49 (2.04%)	0
5' 4"-5' 5"	3/49 (6.12%)	3/49 (6.12%)	0	0	75.6
5' 6"-5' 7"	4/60 (6.66%)	3/60 (5%)	0	1/60 (1.66%)	119.6
5' 8"-5' 9"	0	0	0	0	0
5' 10"-5' 11"	0	0	0	0	0
6'0" 2"	2/21 (9.52%)	1/21 (4.76%)	0	1/21 (4.76%)	186
≥ 6' 3"	0	0	0	0	0

Weight	Unintended vocal cord injury	Transient <6 months	Permanent ≥6 months	Lost to follow	Ava. time of transient recovery (days)
≤ 120 lbs	1/16 (6.25%)	1/16 (6.25%)	0	0	203
121-150 lbs	2/55 (3.63%)	2/55 (3.63%)	0	0	68.5
151-180 lbs	5/75 (6.66%)	2/75 (2.66%)	0	3/75 (4%)	92
181-210 lbs	1/53 (1.89%)	0	1/53 (1.89%)	0	0
211-240 lbs	3/40 (7.5%)	2/40 (5%)	0	1/40 (2.5%)	114.5
≥ 241	1/34 (2.94%)	1/34 (2.94%)	0	0	95

Hypoparathyroidism vs BMI, Height, Weight

BMI	Hypoparathyroidism (PTH<10 postop)	Transient <6 months	Permanent ≥6 months	Lost to follow	Ava. time of PTH<10 recovery (days)
<18.5 kg/m <sup>2</sup> (underweight)	0	0	0	0	0
18.5-24.9 kg/m <sup>2</sup> (normal)	6/65 (9.23%)	4/65 (6.15%)	1/65 (1.54%)	1/65 (1.54%)	4.5
25-29.9 kg/m <sup>2</sup> (overweight)	10/99 (10.1%)	10/99 (10.1%)	0	0	47
30-34.9 kg/m <sup>2</sup> (obese)	4/49 (8.16%)	4/49 (8.16%)	0	0	60.5
≥ 35 kg/m <sup>2</sup> (morbidly obese)	7/58 (12.06%)	7/58 (12.06%)	0	0	34.4

Height	Hypoparathyroidism (PTH<10 postop)	Transient <6 months	Permanent ≥6 months	Lost to follow	Ava. time of PTH<10 recovery (days)
≤ 5' 1"	4/70 (5.71%)	4/70 (5.71%)	0	0	9
5' 2"-5' 3"	7/49 (14.28%)	6/49 (12.24%)	1/49 (2.04%)	0	41.5
5' 4"-5' 5"	4/49 (8.16%)	4/49 (8.16%)	0	0	15.25
5' 6"-5' 7"	3/60 (5%)	3/60 (5%)	0	0	48.3
5' 8"-5' 9"	2/25 (8%)	2/25 (8%)	0	0	3.5
5' 10"-5' 11"	4/24 (16.6%)	3/24 (12.5%)	0	1/24 (4.16%)	63.3
6'0" 2"	2/21 (9.52%)	2/21 (9.52%)	0	0	94
≥ 6' 3"	1/10 (10%)	1/10 (10%)	0	0	5

Weight	Hypoparathyroidism (PTH<10 postop)	Transient <6 months	Permanent ≥6 months	Lost to follow	Ava. time of PTH<10 recovery (days)
≤ 120 lbs	1/16 (6.25%)	1/16 (6.25%)	0	0	3
121-150 lbs	8/55 (14.5%)	7/55 (12.7%)	1/55 (1.81%)	0	13.86
151-180 lbs	5/75 (6.66%)	4/75 (5.33%)	0	1/75 (1.33%)	71.5
181-210 lbs	5/53 (9.43%)	5/53 (9.43%)	0	0	34.8
211-240 lbs	5/40 (12.5%)	5/40 (12.5%)	0	0	54
≥ 241	3/34 (8.82%)	3/34 (8.82%)	0	0	47

Surgery Duration vs BMI, Height, Weight

\*excluded all difficult surgeries/extensive metastatic cancer removal/lymph nodes for duration  
\*increased BMI = increased duration

BMI	Avg. TT duration	Ava. Hemi Duration
<18.5 kg/m <sup>2</sup> (underweight)	0	0
18.5-24.9 kg/m <sup>2</sup> (normal)	154	87.25
25-29.9 kg/m <sup>2</sup> (overweight)	155.6	90.6
30-34.9 kg/m <sup>2</sup> (obese)	160.4	91
≥ 35 kg/m <sup>2</sup> (morbidly obese)	168.6	116.8

Height	Avg. TT duration	Ava. Hemi Duration
≤ 5' 1"	153.5	106.6
5' 2"-5' 3"	178.27	100.43
5' 4"-5' 5"	151.16	86.7
5' 6"-5' 7"	135.4	85.86
5' 8"-5' 9"	162.6	95.6
5' 10"-5' 11"	196.25	105
6'0" 2"	0	119
≥ 6' 3"	165.6	83.6

Weight	Avg. TT duration	Ava. Hemi Duration
≤ 120 lbs	177	84
121-150 lbs	151.3	90.5
151-180 lbs	161.7	82.7
181-210 lbs	136.9	103.8
211-240 lbs	215.16	94.6
≥ 241	154.5	122.8

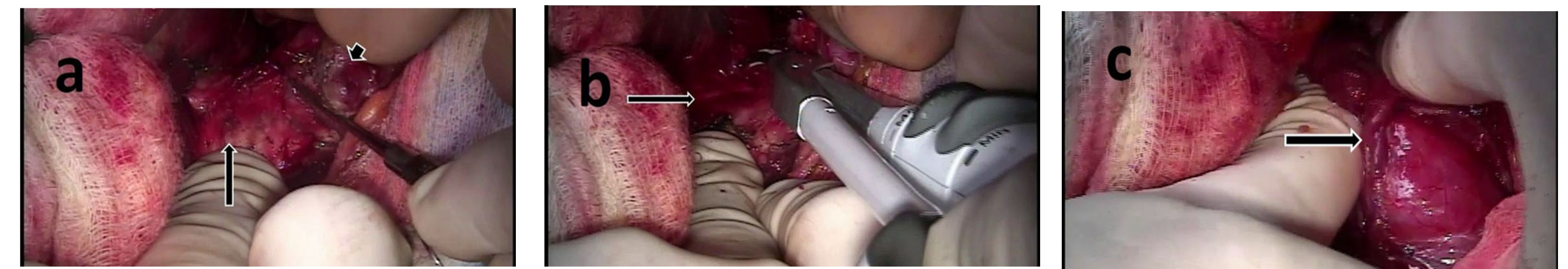
Average Height/Weight Comparison

BMI	Total # of patients	Avg height overall	Avg weight overall	Avg size of VC Paresis	Avg size of Hypoparathyroidism
<18.5 kg/m <sup>2</sup> (underweight)	2	174 cm	50.35 kg	170.2 cm, 82.2 kg	0
18.5-24.9 kg/m <sup>2</sup> (normal)	65	167.28 cm	62.68 kg	167.6 cm, 61.7 kg	
25-29.9 kg/m <sup>2</sup> (overweight)	99	167.83 cm	78.67 kg	164.26 cm, 76.35 kg	167.13 cm, 78.23 kg
30-34.9 kg/m <sup>2</sup> (obese)	49	167.13 cm	90.37 kg	167.65 cm, 87.4 kg	172.73 cm, 98.25
≥ 35 kg/m <sup>2</sup> (morbidly obese)	58	166.8 cm	111.97 kg	163.4 cm, 98.03 kg	164.37 cm, 109.23 kg
All Patients	273	167.40 cm	83.83 kg	165.3 cm, 80.35 cm	167.35 cm, 85.56 kg

## Results

The primary outcomes for this study were operative time, postoperative RLN injury, and postoperative hypoparathyroidism. All patients who underwent total or hemithyroidectomy performed by one surgeon using a medial approach between July 2018 and January 2022 were included. The primary outcomes were compared between two groups based on patient BMI (BMI >25 and BMI <25), and subgroup analysis was performed by type of thyroidectomy (total vs hemi) and complexity of procedure (additional dissection vs no additional dissection)

In this series, we evaluated a total of 274 patients (145 total thyroidectomy, 14 completion, 115 hemithyroidectomy). Of these, 24.1% (N=66) had a BMI <25 and 75.2% (N=206) had a BMI >25. Two patients were excluded from analysis due to incomplete data. Across all patients, mean operative time was 136 minutes in the BMI<25 group and 147 minutes in the BMI>25 group. No significant difference in operative time was found between the groups (p<0.05). Total rates of postoperative hypoparathyroidism were 5.3% (N=2) in the BMI<25 group and 5.8% (N=7) in the BMI>25 group, while rates of postoperative RLN injury were 3.1% (N=2) and 5.6% (N=11), respectively. No significant difference in rate of hypoparathyroidism or RLN injury was found between groups (p<0.05).



## Conclusion

In this study, the medial approach to thyroidectomy demonstrated similar rates of postoperative hypoparathyroidism, RLN injury and operative time. The comparable operative times for thyroidectomy in obese patients suggests that the approach may be favorable in obese patients, given that prior research has shown increased operative times for patients with BMI >25. An important limitation this case series is that it is a series of a single surgeon at a single institution.

## References

- Canu GL, Medas F, Cappellacci F, Podda MG, Romano G, Erdas E, Calò PG. Can thyroidectomy be considered safe in obese patients? A retrospective cohort study. BMC Surg. 2020 Nov 7;20(1):275. doi: 10.1186/s12893-020-00939-w. PMID: 33160350. PMCID: PMC7648980.
- Buerba R, Roman SA, Sosa JA. Thyroidectomy and parathyroidectomy in patients with high body mass index are safe overall: analysis of 26,864 patients. Surgery. 2011 Nov;150(5):950-8. doi: 10.1016/j.surg.2011.02.017. Epub 2011 May 31. PMID: 21621238.
- Frey S, Blanchard C, Caillard C, Druil D, Hamy A, Trésallet C, Miralieu É. Thyroid surgery in obese patients: A review of the literature. J Visc Surg. 2020 Oct;157(5):401-409. doi: 10.1016/j.jvisurg.2020.06.002. Epub 2020 Jun 24. PMID: 32591245.
- Bianchard C, Bannani S, Pattou F, Brunaud L, Hamy A, Christou N, Mattonnet M, Dahan M, Prades JM, Landey G, Demis HP, Sebarg F, Babin E, Bizou A, Lifante JC, Jegoux F, Volteau C, Caillard C, Riche VP, Miralieu É. Impact of body mass index on post-thyroidectomy morbidity. Head Neck. 2019 Sep;41(9):2952-2959. doi: 10.1002/hed.25773. Epub 2019 Apr 19. PMID: 31002213.
- Milone M, Musella M, Conzo G, Campana G, De Filippo D, Coretti G, Amato M, Salvatore G, Amato B, Milone F. Thyroidectomy in high body mass index patients: A single center experience. Int J Surg. 2016 Apr;28 Suppl 1:S38-41. doi: 10.1016/j.ijsu.2015.12.054. Epub 2015 Dec 18. PMID: 26708851.
- Ustun M, Karaca AC, Birci I, Uslu G, Alici SD, Aydin C. The relationship between thyroidectomy complications and body mass index. Rev Assoc Med Bras (1992). 2020 Nov;66(11):1573-1576. doi: 10.1590/1806-9282.66.11.1573. PMID: 33295412.