Cross-sectional Study

Indications and complications for surgical management of thyroid diseases: A single center experience

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ABSTRACT

Background: Thyroid disorders are one of the most common endocrine disorders. Thyroid disorders are highly prevalent in the Saudi population. There are many approaches to treat thyroid disorders, varying from conservative to surgical, depending on the severity of each condition. There are many indications for surgical management of thyroid diseases, including carcinoma, hyperthyroidism, and local compression symptoms.

Materials and methods: This is a retrospective study included subjects operated upon for a thyroid disorder over 6 years period in the eastern province of Saudi Arabia.

Results: The clinical manifestations and postoperative characteristics of the patients are given in Table 2. It can be observed that the most dominant clinical presentation was neck mass (76.4%), while the most common indication of surgery was the suspicion of cancer (54.5%). Furthermore, the most common histopathology was papillary thyroid cancer (41.8%), whereas the most common complication after the surgery was hypocalcemia (9.1%). Likewise, total thyroidectomy was the most commonly sought surgical intervention (70.9%). Additionally, Bethesda class III constitutes 35.1%, while Bethesda class II constitutes 29.7%.

Conclusion: Suspicion of cancer was the most prominent indication for surgical intervention. The most prevalent postoperative complications were hypocalcemia. Furthermore, papillary thyroid carcinoma was the most common histological findings, which raises several questions since it contrasts with previous studies done in Saudi Arabia. We believe that the number of thyroid procedures in our region is underreported, and more research is needed to validate this.

1. Introduction

Thyroid disorders are one of the most common endocrine disorders [1]. According to the World Health Organization (WHO), more than 190 million people have iodine deficiency disorders [2]. Thyroid gland is essential for body metabolism. Dysfunction of the thyroid gland has a major effect on human health and quality of life [3].

Thyroid disorders are highly prevalent in Saudi population [4]. Thyroid malignancy is the second most common malignancy affecting women between the age of 35–39 years and the eighth among males in Saudi Arabia [5]. According to the 2015 Saudi Cancer Registry report, there were a total of 1020 thyroid cases cancer accounting to 8.5% from all newly diagnosed cancers in 2015. Also, thyroid cancer affected 793 (77.7%) females and 227 (22.3%) males; with a female to male ratio of 3.5:1.

There are many approaches to treat thyroid disorders, varying from conservative to surgical, depending on the severity of each condition. Surgical management of thyroid disorders is a common procedure all over the world [6]. In Germany, the number of thyroid surgeries between 2005 and 2013 was 79,000 to 89,000 per year [7]. Furthermore, in many cases, thyroid surgery remains the treatment of choice, despite the advances of conservative management [8].

There are many indications for surgical management of thyroid diseases, including carcinoma, hyperthyroidism, and local compression symptoms [9]. A recent study done in Saudi Arabia on 129 cases shows that the most common indication for surgical management is local compression symptoms, which accounts for 43% of all cases [8]. Furthermore, out of 129 cases, 9 patients had Recurrent laryngeal nerve injury (RLN) (8). Moreover, RLN is considered to be the most common surgical complication relative to other complications such as hematoma and hypocalcemia [8].

There are a limited number of studies in Saudi Arabia that point out the surgical indication of thyroid disorders in Eastern province, particularly in Al-Ahsa city. Hence, this study aims to highlight the surgical indication for thyroid disorders and to evaluate the rate and type of postoperative complications in Eastern province, Al-Ahsa city.

2. Materials and methods

This is a retrospective study included subjects operated upon for a thyroid disorder over 6 years period in the eastern province of Saudi
Arabia from January 2015 to December 2020. All patients who had any thyroid disorder and underwent thyroid surgery were included in this study. Patients who were not diagnosed with any thyroid disorder or did not undergo any thyroid surgery were excluded from this study. Patient data was collected from National guard hospital record in Al-Ahsa city. The data was used to gather information on the following variables: socio-demographics, the clinical diagnosis, the manifestation of thyroid lesions, Indication of thyroid Surgery, histopathology pattern of thyroid lesion, and post-operative complications. The patient’s personal information kept confidential with complete privacy. The study was approved by the Ethics Research Committee at the College of Medicine, King Faisal University.

Quantitative data are presented using mean ± Standard deviation (SD) or median with interquartile range if appropriate. Qualitative data are presented using counts and proportions (%). Between comparisons, Fischer Exact test (categorical variables) and paired sample t-test (continuous variables) were applied. A p-value of <0.05 (two-sided) was used to indicate statistical significance. All data analyses were performed using the Statistical Packages for Social Sciences (SPSS) version 26 Armonk, NY: IBM Corp.

This study has been reported in line with the STROCSS criteria [20].

3. Results

We analyzed 55 patients to determine the indications and complications for surgical management of thyroid diseases. As seen in Table 1, the mean age of the patients was 45.9 (SD 13.9) years old with females dominating the males (87.3% vs 12.7%). Nearly all (90.9%) were Al Ahsa residents compromising with mostly Saudis (94.5%). Furthermore, 81.8% were admitted to general surgery. The most common diagnosis related to thyroid disease was thyroid nodule (65.5%).

The clinical manifestations and postoperative characteristics of the patients were given in Table 2. It can be observed that the most dominant clinical presentation was neck mass (76.4%) while the most common indication of surgery was the suspicion of cancer (54.5%). The most common histopathology was papillary thyroid cancer (41.8%) whereas the commonest type of surgery was total thyroidectomy (70.9%).

When measuring the differences of laboratory parameters before and after surgery, we observed that the mean value of PTH was statistically significant after surgery (mean diff. = -2.809; p = 0.003) while the differences of TSH, T4 and Ca before and after surgery were not statistically significant (p > 0.05) (see Table 3).

When measuring the relationship between the type of the surgery in regards to the clinical manifestations and postoperative characteristics of the patients, it was found that the prevalence of patients who had a suspicion of cancer as an indication of surgery (p = 0.021) and papillary thyroid cancer as diagnosis during histopathology (p = 0.001) was more common among those who underwent total thyroidectomy while clinical presentation, postop complication, and Bethesda classification did not show a significant relationship in both thyroidectomy and lobectomy surgical procedures (p > 0.05) (see Table 4).

4. Discussion

Thyroid disorders are one of the most common endocrine disorders [1]. Thyroid disorders are highly prevalent in Saudi population [4]. There are many indications for surgical management of thyroid diseases,
**Table 4**

Association between the type of the surgery among Clinical manifestations and Postoperative characteristics of patients (n = 39).

| Factor                          | Thyroidectomy | Lobectomy | P-value\(^1\) |
|---------------------------------|---------------|-----------|---------------|
| **Clinical presentation**       |               |           |               |
| Neck mass without pressure      | 32 (82.1%)    | 10 (62.5%)| 0.101         |
| symptoms                        | (n = 39)      | (n = 15)  |               |
| Neck Mass with pressure symptoms| 07 (17.9%)    | 05 (31.3%)|               |
| Others                          | 0             | 01 (60.3%)|               |
| **Indication of surgery**       |               |           |               |
| Suspicion of cancer             | 26 (66.7%)    | 04 (25.0%)| 0.021         |
| Compression symptoms            | 04 (10.3%)    | 04 (25.0%)| **           |
| Thyroid nodules                 | 05 (12.8%)    | 04 (25.0%)|               |
| Papillary thyroid cancer        | 02 (05.1%)    | 01 (06.3%)|               |
| Goiter                          | 02 (05.1%)    | 01 (06.3%)|               |
| Others                          | 0             | 02 (12.5%)|               |
| **Histopathology**              |               |           |               |
| Papillary thyroid cancer        | 21 (53.8%)    | 02 (12.5%)| 0.001         |
| Multinodular colloid goiter     | 14 (35.9%)    | 05 (31.3%)| **           |
| Follicular adenoma              | 01 (02.6%)    | 03 (18.8%)|               |
| Hyperplastic nodule             | 01 (02.6%)    | 01 (06.3%)|               |
| Thyroid nodule                  | 0              | 04 (25.0%)|               |
| Others                          | 02 (05.1%)    | 01 (06.3%)|               |
| Postoperative complication      |               |           |               |
| None                            | 29 (74.4%)    | 12 (75.0%)| 0.852         |
| Hypocalcemia                    | 04 (10.3%)    | 01 (06.3%)|               |
| Right vocal cord paralysis      | 01 (02.6%)    | 01 (06.3%)|               |
| RLN injury                      | 01 (02.6%)    | 01 (06.3%)|               |
| Others                          | 04 (10.3%)    | 01 (06.3%)|               |
| **Bethesda classification**     |               |           |               |
| II                              | 11 (29.7%)    | 05 (33.3%)| 0.133         |
| III                             | 13 (35.1%)    | 08 (53.3%)|               |
| IV                              | 01 (02.6%)    | 01 (06.7%)|               |
| V                               | 10 (27.0%)    | 0         |               |
| VI                              | 02 (05.1%)    | 01 (06.7%)|               |

\(^1\) P-value has been calculated using Fischer Exact test.

\(^2\) Significant at p < 0.05 level.

\(^3\) None cases were excluded from the analysis.

**5. Conclusion**

The current study findings strongly suggest that thyroid diseases are more frequent in women than in men. Suspicion of cancer was the most prominent indication for surgical intervention. The most prevalent postoperative complications were hypocalcemia. Furthermore, papillary thyroid carcinoma was the most common histological finding, which raises several questions since it contrasts with previous studies done in Saudi Arabia. We believe that the number of thyroid procedures in our region is underreported, and more research is needed to validate this.

**Ethical approval**

The study was approved by King Faisal University College of Medicine’s Ethics Research Committee with references number (13 - 10 - 2020), and all requirement document will be provided when needed.

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**Author contribution**

Khalid A. Alyahya: principle investigator, contribute in study concept, and writing the paper, Abdullah A. Alarfaaj: co-author, contribute in study concept, and writing the paper, Abdulwahab A. Alyahya: co-author, contribute in study concept and design, data collection, data analysis and interpretation, writing the paper. Abdulrahman E. Alnaim: co-author and corresponding author, contribute in data collection, data analysis and interpretation, writing the paper.
Registration of research studies

Name of the registry: research registry.
Unique Identifying number or registration ID: researchregistry7402.
Hyperlink to your specific registration (must be publicly accessible and will be checked): https://researchregistry.knack.com/research-registry#user-researchregistry/registerresearchdetails/619fb34ad839e9001fdba90/

Guarantor

Authors are the guarantors of this article and they have the full responsibility for the work.

Declaration of competing interest

All authors declare that they have no conflicts of interest, and that they have no financial or personal relationships with any people or organizations that could improperly affect (bias) our work.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2022.103980.

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