The Egyptian Journal of Hospital Medicine (October 2021) Vol. 85 (2), Page 4120-4125

Surgical Management and Outcome of Patients with Thyroid Diseases during the COVID-19 Pandemic

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ABSTRACT

Background: Globally, healthcare authorities have reacted by restricting medical care to emergency cases and postponing elective surgical procedures of all types. Elective surgeries have been almost totally postponed keeping to a minimum the risk of transmission of SARS-CoV-2 and to allow a better allocation of resources. Since thyroid surgery usually does not cover immediate surgical interventions, during this pandemic nearly all the patients who require thyroid surgery care are experiencing delays in the operation planning procedure.

Objective: The aim of the work was to investigate the impact of COVID-19 pandemic on thyroid surgery.

Subjects and methods: We conducted prospective study from August 2020 to February 2021 among all patients who attended to Damanhur Medical National Institute Hospital. Total sample size was 60 patients and patients with positive COVID-19 were enrolled in group 1 (cases) and those who were negative COVID-19 were enrolled in group 2 (controls).

Results: A total of 60 patients were seen during the study period. Males were 35 (58.3%) while females were 25 (41.7%). The mean age 39.5± 9.5 years. There is no statistically significant difference between patients with COVID-19 and patients without COVID-19 regarding developing complications from thyroid surgeries.

Conclusion: The COVID-19 pandemic has created a complicated set of issues for patients with endocrine-related cancers. Most thyroid cancers are indolent and so postponement of surgery in the era of COVID-19. There is no significant association between COVID-19 and complications of surgery.

Key words: Thyroid diseases, COVID-19, Thyroid surgery, endocrine cancers

INTRODUCTION

As the number of cases continued to rise, a rapidly increasing number of hospitals were designated by Governments for the exclusive admission of patients with SARS-CoV-2 (Covid19) to contain cross-infection [(1)]. The 2019 novel coronavirus and the disease it causes (COVID-19) is a public health crisis that has profoundly modified the way medical and surgical care is delivered. Countries around the globe had a variable initial response to the COVID-19 pandemic from imposing massive lock downs and quarantine to surrendering to herd immunity [(2)].

Globally, healthcare authorities have reacted by restricting medical care to emergency cases and postponing elective surgical procedures of all types. The priority was made for the treatment of COVID-19 patients and emergency cases, in anticipation of a possible need for hospital beds and resources [(3,4)].

The American College of Surgeons (ACS) called to prioritize appropriate resource allocation as it relates to elective procedures and minimize the use of essential items required to care for patients [(5)].

Nevertheless, the unpredictability of the timeline of COVID-19 in the absence of effective drug treatments and vaccination, suggests that patients may be deprived of access to needed surgical care, likely for many months [(6)]. The potential outcome of delay in necessary elective surgical procedures may have a more detrimental impact on patients' health compared to that of COVID-19 itself. Therefore, we have proposed a comprehensive strategy that allows for the safe and timely delivery of surgical care during COVID-19 and applied it institutionally [(7,8)].

The expected effect of the constraint on surgical planning due to the need to limit hospital access was to preserve only essential surgical procedures, freezing waiting times for surgeries for conditions without developmental risk and freeing professionals and patient care facilities for SARS-CoV-2 patients [(9,10)].

Elective surgeries have been almost totally postponed to keep a minimum the risk of transmission of SARS-CoV-2 and also to allow a better allocation of resources [(11)]. Since thyroid surgery usually does not cover immediate surgical interventions, during the COVID-19 pandemic nearly all of the patients who require thyroid surgery care are experiencing delays in the operation planning procedure [(12)].

The impact of the SARS-CoV-2 pandemic on thyroid surgery, is yet to be investigated [(1,13)].

The aim of the current work was to investigate the impact of COVID-19 pandemic on thyroid surgery.

PATIENTS AND METHODS

This study was conducted prospectively from August 2020 to February 2021 among all patients having thyroid nodules and or cancer and fulfilling one of the inclusion criteria, attended at Damanhur Medical National Institute Hospital. Enrolled patients aged from 25- 60 (39.5± 9.5) years.

Follow up period was one month to detect complications after surgery. Any patient with unexplained fever or any symptoms related to COVID-

Received:25 /7 /2021
Accepted:21 /9 /2021

19 led to isolation in a separate room and screening for COVID-19. Total sample size was 60 patients and patients with positive COVID-19 were enrolled in group 1 (cases) and those who were negative COVID-19 were enrolled in group 2 (controls).

Inclusion criteria: Fine needle aspiration indicating risk of cancer, aggressive signs, poorly controlled thyrotoxicosis, benign nodule with compression and/or increase in size and patients with suspected carcinoma who had psychological stress.

Exclusion criteria: Any patient aged below 25 and or above 60 years, mild symptoms and signs, well-controlled thyrotoxicosis, nodules without compression symptoms and constant size.

Ethical approval:

The Ethics Committee of the Damanhur Medical National Institute Hospital approved the study protocol, and all patients gave a written informed consent for participation in this study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Data collection: Patients who agreed to participate in the study answered questionnaires regarding demographic data and clinical characteristics. Also, outcome of 60 thyroid procedure were recorded.

Statistical analysis

Continuous variables were reported as means ± standard deviations. All P-values were two-sided, and P-values of < 0.05 were considered statistically significant. Chi square test was used to investigate association between complications of surgery and COVID-19 infection. All statistical analyses were performed using the statistical package for the social sciences software (SPSS version 21.0, Chicago, IL, USA).

RESULTS

60 patients were included, and their mean age was 39.5± 9.5. Males were 35 (58.3%) while females were 25 (41.7%). 36.7% of them had body mass index below 25. Among the participants, 30% were current smokers and 88.4% were non-alcoholic. Also, there were 41.7% had diabetes mellitus, 51.7% had hypertension, 25% had hyperlipidemia and 28.3% had fatty liver. **Table (1), Figure (1)**

Table 1: Sociodemographic data of the participants (N=60)

Items	N= 60
Age (years)	39.5± 9.5
Gender	
Male No. (%)	35 (58.3)
Female No. (%)	25 (41.7)
BMI (kg/m^2)	
<25 No. (%)	22 (36.7)
-30 No. (%)	17 (28.3)
-35 No. (%)	15 (25)
>35 No. (%)	6 (10)
Smoking	
Non-smoker No. (%)	28 (46.7)
Ex-smoker No. (%)	14 (23.3)
Current smoker No. (%)	18 (30.0)
Comorbidities	
Diabetes mellitus No. (%)	25 (41.7)
Hypertension No. (%)	31 (51.7)
Hyperlipidemia No. (%)	15 (25)
Fatty liver No. (%)	17 (28.3)
Thyroid surgery history No. (%)	9 (15)
Alcohol consumption	
No. (%)	53 (88.4)
Past No. (%)	5 (8.3)
Current No. (%)	2 (3.3)

Quantitative data represented as mean± SD
Qualitative data represented as frequency and percentage
BMI: body mass index

Figure 1: Total thyroidectomy

Final pathological diagnosis indicated that there were 51.7% had papillary carcinoma, 20% had benign thyroid disorders, 5% had invasive squamous cell carcinoma, 13.3% had extrathyroidal extension and 10% had lymph node metastasis.

Table (2), Figure (2)

Table 2 :Diagnosis of thyroid disease among the participants

Diagnosis	**No. (%)**
Papillary carcinoma	31 (51.7)
Benign thyroid disorders	12 (20)
Invasive squamous cell carcinoma	3 (5)
Extrathyroidal extension	8 (13.3)
Lymph node metastasis	6 (10)

Qualitative data represented as frequency and percentage

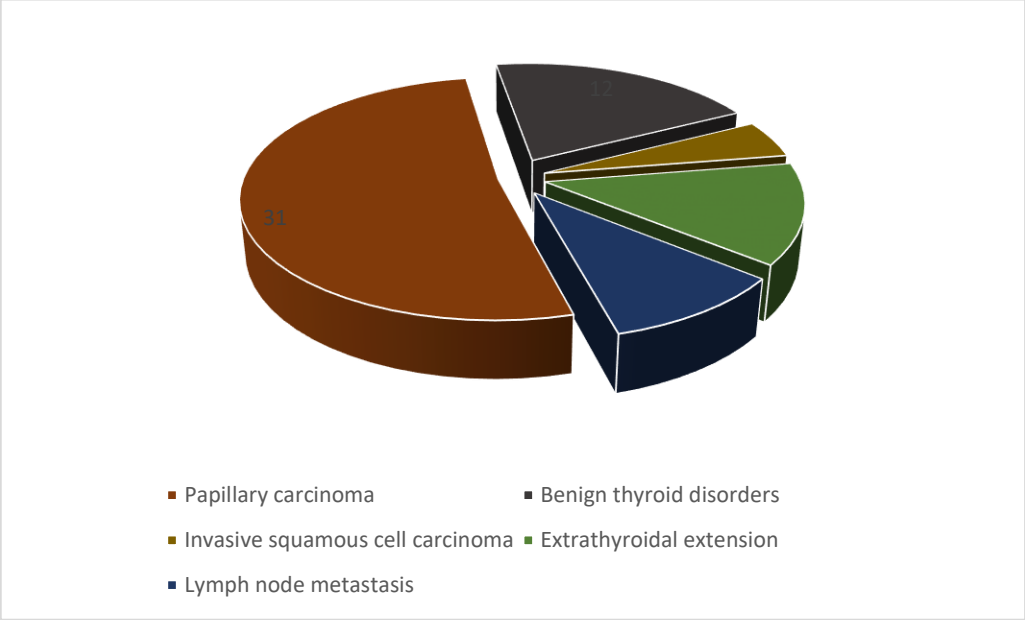

Figure 2 Diagnosis of the thyroid diseases among the participants

The triage to surgery using fine needle aspiration indicated that risk of cancer was found in 45% of the participants, poorly controlled thyrotoxicosis in 5%, patients who had compressive symptoms 20% and 30% had suspected lymph node metastasis **Table (3).**

Table 3: pre-surgical and surgical procedures among the participants

Variables	NO. (%)
Triage to surgery	
Fine needle aspiration	27 (45)
Thyrotoxicosis	3 (5)
Compressive symptoms	12 (20)
Suspected lymph node metastasis	18 (30)
Surgical procedure	
Total thyroidectomy	39 (65)
Hemithyroidectomy	15 (25)
Lateral lymph node dissection	6 (10)

Qualitative data represented as frequency and percentage

Table 4 shows that there is no statistically significant difference between patients with COVID-19 and patients without COVID-19 regarding developing complications from thyroid surgeries.

Table 4: Association between COVID-19 and developing complications

Variables	Positive COVID-19 infection n= 20	Negative COVID-19 infection n= 40	P value
Death			
Yes No. (%)	1 (5)	0 (0)	0.152
No No. (%)	19 (95)	40 (100)	
Hemorrhage			
Yes No. (%)	2 (10)	4 (10)	0.633
No (%)	18 (90)	36 (90)	
Hoarseness of voice			
Yes No. (%)	0 (0)	1 (2.5)	0.545
No No. (%)	20 (100)	39 (97.5)	
Hypocalcemia			
Yes No. (%)	0 (0)	0 (0)	0.925
No No. (%)	20 (100)	40 (100)	
Wound infection			
Yes No. (%)	0 (0)	2 (5)	0.241
No (%)	20 (100)	38 (95)	

Qualitative data represented as frequency and percentages
Chi square test, * P is significant at < 0.05

DISCUSSION

Although maintaining the infrastructure of healthcare systems and their capacity to accommodate a potentially overwhelming increase in critical patient care needs is important during a pandemic, providing safe and timely surgical care is considered equally important adhering to the motto of Medicine "primum non nocere" [(14)].

When prioritizing surgical cases, these fall along a continuum and are stratified according to indication and degree of urgency bearing in mind that many elective surgical procedures could upgrade in terms of priority at any time and become urgent or emergent [(15)].

Surgical treatment plans for cancer are considered as essential elective procedures Nevertheless; the cancer patient should be regarded as a person under a special and severe form of stress. There is mounting anxiety which may at times increase to where the individual is disorganized [(14)].

Therefore, undue delay in delivering essential surgical care has the potential for an additive detrimental impact on mental health. Our institute's policy for the care of surgical patients in the time of COVID-19 dictates proceeding with essential elective cancer surgery in patients coming from areas of no or low regional prevalence without nucleic acid amplification testing [(13)].

Patients with thyroid disorders are frequently encountered in an endocrinology outpatient clinic. Although there is no evidence that patients with poorly controlled thyroid disease are more likely to contract viral infection in general, it is possible that patients with uncontrolled hyperthyroidism may be at a higher risk of complications (like thyroid storm) precipitated by any infection [(7,8)].

In selected cases of uncontrolled thyrotoxicosis not responding to medical management, urgent surgery or radioactive iodine ablation may be undertaken. In addition, patients with COVID-19 presenting with conjunctivitis may cause diagnostic difficulties in those with newonset or existing thyroid-associated orbitopathy (TAO) [(10)].

In our study there were some complications of the surgeries among the patients with no COVID-19 infection. There were 10% had hemorrhage and 5% had wound infection while among patients with positive COVID-19 infection there were 10% had hemorrhage and 5% died. There was no statistically significant difference between group 1 with COVID-19 patients and group 2 without COVID-19 patients regarding complications of the surgeries.

This goes parallel with **Zhao *et al.*** [(12)] in their study among 50 patients with thyroid diseases underwent thyroid surgeries during COVID-19. Patients were included prospectively from March to June 2020. As the COVID-19 pandemic continues, more and more experience were being gained. Systematic and adequate infection control measures can be effective in COVID-19 prevention and in protecting patients.

Patients who undergo thyroid surgery have limited demand for ICU beds and blood transfusions [(11)]. Most patients need only a short hospital stay, and, in this series, no surgical complications were observed. Thus, with sufficient preoperative planning and preparation, elective thyroid surgery was safe, and no patient or healthcare worker was confirmed to have COVID-19 infection. Care should be taken to balance the risk of COVID-19 infection against a sustainable resumption of elective procedures, and to take sufficient measures to keep patients and health workers safe from SARS-CoV-2.

The triage to surgery using fine needle aspiration indicated that risk of cancer was found in 45% of the participants, poorly controlled thyrotoxicosis in 5%, patients who had compressive symptoms 20% and 30% had suspected lymph node metastasis.

However **Zhao *et al.*** [(12)] found that twenty-five patients (50 per cent) had a FNA suspicious of cancer before surgery. Ten patients had suspected lymph node metastasis and nine had compressive symptoms. In terms of surgical procedure, 18 patients had a hemithyroidectomy and 32 underwent total thyroidectomy, of which six procedures were combined with lateral lymph node dissection.

In our study regarding final pathological diagnosis there were 51.7% had papillary carcinoma, 20% had benign thyroid disorders, 5% had invasive squamous cell carcinoma, 13.3% had extrathyroidal extension and 10% had lymph node metastasis.

Although in another study there were 36 patients were diagnosed with papillary carcinoma and one had invasive squamous cell carcinoma. Among the 36 patients with papillary carcinoma, 17 had extrathyroidal extension and 15 had metastatic nodes. Thirteen patients had benign thyroid disorders on final pathology [(5)].

The COVID-19 pandemic has created a complicated set of issues for patients with endocrine-related cancers, wherein patients, families and healthcare workers are potentially placed at increased risk. As the COVID-19 pandemic continues, more and more experience is being gained. Systematic and adequate infection control measures can be effective in COVID-19 prevention and in protecting patients. [(17)]

Most thyroid cancers are indolent and so postponement of surgery in the era of COVID-19 has been suggested. There are limited data on the optimal postponement time. It has now been more than six months since the official announcement of the SARS-CoV-2 outbreak in China, and the WHO has expressed concerns that the virus may become endemic If deferral of elective surgery continues, especially in countries where COVID-19 is well controlled, not only will patients' distress worsen with time, but also surgeons will face stress and financial difficulties [(16)]

CONCLUSION

It could be concluded that the COVID-19 pandemic has created a complicated set of issues for patients with endocrine-related cancers. Most thyroid cancers are indolent and so postponement of surgery in the era of COVID-19. There is no significant association between COVID-19 and complications of surgery.

Declarations:

Consent for Publication: I confirm that all authors accept the manuscript for submission

Availability of data and materials: Available

Competing interests: none

Funding: No fund

Conflicts of Interest: The authors declare no conflicts of interest regarding the publication of this paper.

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