COVID-19 era and thyroid surgery

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ABSTRACT

We aim to update the pandemic literature concerning thyroidectomies for benign and malign conditions. The inclusion criteria: PubMed published papers, the key words of research are “thyroidectomy” or “thyroid surgery” or “endocrine surgery” and “coronavirus”, “pandemic” or “COVID-19”. The reduction of thyroid ultrasound and fine needle aspiration is reflected in a lower volume of indications for surgery depending on the phases of pandemic and the rate of infections in general population. Imperative surgical approach is needed in cases with poor prognostic like poorly differentiated, undifferentiated, anaplastic and medullary carcinoma, while cases with well differentiated carcinoma originating from follicular cells associate a less aggressive behavior, thus the overall prognostic might not be affected if surgery is postponed. During the period of times with severe restrictions and high infection rates in general population, the delay of surgical procedures was unavoidable, thus scores of assigning the moment of operation were introduced as PAPS (Physician Assigned Priority Scoring) and MeNTS (Medically Necessary Time Sensitive). The need of assessing post-thyroidectomy complications is essential in situations when telemedicine is not a solution as severe cases of hypocalcemia, vocal folds damage, local liquid collections, etc. In conclusion, scores validation is still needed. Critical pre-operative decision takes into consideration the pandemic circumstances (COVID-19 status of the patient and of the health workers involved in the procedure). Use of digital health care systems might reduce the pre- and post-operative burden. Overall, a reduction of thyroid surgery volume was registered during the first year of pandemic all over the world, while the procedure itself seems safe for the patient from a point of view related to the risk of coronavirus cross-infection.

Keywords: thyroidectomy, thyroid, nodule, COVID-19 pandemic, coronavirus, endocrine surgery, thyroid surgery

INTRODUCTION

Thyroid hosts the coronavirus, thus the potential implications on thyroid conditions and associated thyroid surgery (1,2). The reduction of thyroid ultrasound and fine needle aspiration is reflected in a lower volume of indications for surgery depending on the phases of pandemic and the rate of infections in general population (3-6). Imperative surgical approach is needed in cases with poor prognostic like poorly differentiated, undifferentiated, anaplastic and medullary carcinoma while cases with well differentiated carcinoma originating from follicular cells associate a less aggressive behavior thus the overall prognostic might not be affected in cases with delayed surgery (7,8,9) (Figure 1).
METHOD

We aim to update the pandemic literature concerning thyroidectomies for benign and malign conditions. This is a review type of paper. The inclusion criteria: PubMed published papers, the key words of research are “thyroidectomy” or “thyroid surgery” or “endocrine surgery” and “coronavirus”, “pandemic” or “COVID-19”. We cited articles of various types like original studies, case reports and reviews, respective experts’ opinions. The selection is based on clinical relevance for practitioners related to the field of thyroid surgery according to the subsections we created below.

ASSIGNING / PLANNING A SURGICAL INTERVENTION AMID PANDEMIC

During the period of times with severe restrictions and high infection rates in general population, the delay of surgical procedures was unavoidable, thus scores of assigning the moment of operation were introduced as PAPS (Physician Assigned Priority Scoring) and MeNTS (Medically Necessary Time Sensitive) (10-23). One study on 146 patients (68% women, median age of 60) showed a statistically significant delay between low and high PAPS (79 days versus 35 days, p = 0.01) while by using MeNTS, the subjects with benign thyroid conditions had a statistically significant higher score than people with suspected or confirmed thyroid malignancy without correlations to delay of surgery, thus PAPS seems a better predictor than MeNTS concerning the timing of intervention (24). A retrospective study included patients between 2017 and 2020 showed that patients referred to thyroidectomy during pandemic are more likely to be confirmed after surgery with a more aggressive thyroid neoplasia (25). THYCOVIT is a study dedicated to thyroid surgery, realized in Italy during the first year of pandemic; this is a multi-centric (28 centers), national, case-controlled study comparing the volume of interventions in 2020 versus 2019; 3,892 procedures were taken into consideration; (38% in 2020), the reduction of procedures number depends of pandemic months, varying between 5% and 65% (26).

VOLUME OF SURGICAL PROCEDURES AMID PANDEMIC

One study evaluated the changes on endocrine surgery practice that were required as an adjustment to pandemic; this is a retrospective study enrolling patients from April to October 2020 and similar period of time from 2019; a number of 130 surgeries was reduced to 89 procedures during pandemic; the initial pre-operatory assessments were similar between pre-pandemic and pandemic surgeries; 68% of operation capacity was conserved amid pandemic months; the post-operative complications were similar, while no patient became COVID-19 positive during hospitalization (27). The thyroid surgery experience of a tertiary center during 2020 showed the impact of pandemic in terms of 20% volume reduction when compare to 2019 (28). A prospective study coming from China showed that during 2020 there was a massive reduction of thyroid surgery versus 2019 (up to no surgery during first phase of pandemic) and the procedures that were performed had a statistically significant shorter hospitalization stay; no case was re-admitted for post-operative complications, and no case of COVID-19 infection during admission was detected (29).
POTENTIAL SURGERY-RELATED COMPLICATIONS

The need of assessing post-thyroidectomy complications is essential in situations when telemedicine is not a solution as severe cases of hypocalcemia, vocal folds damage, liquid collections, etc (30,31,32). One study on pediatric thyroidectomies focused on iatrogenic recurrent laryngeal nerve and vocal folds anomalies by using ultrasonography during surgical procedure since standard flexible naso-endoscopy exposes to an increased risk of contracting the coronavirus (as a post-operative additional evaluation) (33). This is a prospective study for 2 years showed on 15 thyroidectomies that the accuracy of intra-operative ultrasound is 92% which is a more useful alternative amid pandemic circumstances (33) Post-thyroidectomy hypothyroidism does not seem a particular COVID-19 infection risk (34,35). A positive coronavirus infection might associate a higher risk of hypocalcemia in severe cases or hepatic damage in peri-operative circumstances considering the potential anesthetics exposure (36,37). As seen in others medical and surgical domains, the pandemic stress should be taken into consideration in patients referred to thyroidectomy and followed after that or patients waiting for a thyroid surgery (38,39).

A meta-analysis from 2021 on thyroid surgery included 293 papers; 9 studies were selected for statistics and revealed on 2217 procedures that 60.8% of patients had a diagnostic of thyroid cancer; the protocol varied with hospital; the average hospital stay was 48-72 hours; cross-infection ratio was of 1.9% and 0.4% of them associated a severe COVID-19-related lung involvement which is considered a good safety profile based on infectious rational amid pandemics (40).

A multi-centric, international (26 countries), observational study on 1,137 surgical interventions for head and neck cancer (including thyroid cancer – 21% of them) identified a percent of 1.2% as 30-day mortality, as well as a ratio of 3% as being those who were found COVID-19 positive during first month after surgery; the severe infection was correlated with advanced tumor at presentation; 3% of health care professionals were also found positive at coronavirus test within the first 30 days after operation (41). Overall, thyroid surgery might seem a safe procedure for both patient and surgical team (41). However, other procedures like emergent tracheostomy (with local anesthesia) in cases where oro-tracheal intubation is not feasible, it represents a particularly infectious high-risk procedure for practitioners (42). Intubation issues are found in patients with respiratory conditions, sleep apnea as seen in acromegaly, obesity or heavy smokers, which also might complicate a potential coronavirus infection (43,44,45).

DISCUSSIONS

Whether the implementation of mandatory vaccination before thyroidectomy will become the “new normal” is still a matter of debate (46,47). Until then, the rule of self - isolation at home for 2 weeks before surgery seems rational to avoid a positive infectious status at the moment of surgery, and to avoid unnecessary exposure of health care practitioners (46,47,48). Also, case-finding and case-treating strategies via digital medicine are still a new and open chapter of medicine (48-51).

CONCLUSIONS

Validation of scores is needed. Critical pre-operatory decision takes into consideration the pandemic circumstances (COVID-19 status of the patient and of the health workers involved in the procedure). Use of digital health care systems might reduce the pre- and post-operative burden. Overall, a reduction of thyroid surgery volume was registered during the first year of pandemic while the procedure itself seems safe for the patient from a point of view related to the risk of coronavirus infection.
Medullary Thyroid Carcinoma. AACE Clin Case Rep. 2021 Sep-Oct;7(5):288-292.

6. Vigilar E, Cepurnate R, Iaccarino A, Pisapia P, De Luca C, Malapelle U, Bellecivinc C, Troncone G. Cytopathology practice during the COVID-19 postlockdown: An Italian experience. Cancer Cytopathol. 2021 Jul;129(7):548-554.

7. Spartalis E, Plakopitis N, Theodori MA, Karagiannis SS, Athanasiadis DI, Spartalis M, Boutzios G, Paschou SA, Nikelos N, Troupis T. Thyroid cancer surgery during the coronavirus disease 2019 pandemic: perioperative management and oncological and anatomical considerations. Future Oncol. 2021 Nov;17(32):4389-4395.

8. Sira L, Balogh Z, Vitalis E, Kovacs D, Gyoery F, Molnar C, Bodor M, Nagy EV. Case Report: Medullary Thyroid Cancer Workup Initiated by Unexpectedly High Procalcitonin Level-Endocrine Training Saves Life in the COVID-19 Unit. Front Endocrinol (Lausanne). 2021 Oct 11:727320.

9. Chai C, Feng X, Lu M, Li S, Chen K, Wang H, Wang W, et al. One-year mortality and consequences of COVID-19 in cancer patients: A cohort study. IJUJMBS Life. 2021 Oct;73(10):1244-1256.

10. Nickel B, Miller JA, Cvejic E, Gild ML, Cope D, Dodd R, McCafferty K, Glover A. Thyroid cancer clinicians' views and experiences of delayed treatment during the COVID-19 pandemic: An international cross-sectional survey. ANZ J Surg. 2021 Dec;91(12):2562-2564.

11. Gravesteijn B, Krijkmann J, Busschbach J, Geleijnse G, et al.; Value Based Operation Improvement and Adaptation of the Medically Necessary, Time-Sensitive Surgical Procedures triage and prioritization tool. Can J Surg. 2021 Feb;63(1):E48-E50.

12. Soler E, Farah SN, Bustos VP, Medina SEM, Gómez JF, Lema EM, Moreno CA. Experience of clinical screening for COVID-19 among patients undergoing elective orthopedic surgeries: an alternative proposal. J Orthop Surg Res. 2021 Feb;16(1):103.

13. Cohn JA, Ghiraldi EM, Uzzo RG, Simhan J. A Critical Appraisal of the American College of Surgeons Medically Necessary, Time Sensitive Procedures (MeNCTS) Scoring System, Urology Consensus Recommendations and Individual Surgeon Case Prioritization for Resumption of Elective Urological Surgery During the COVID-19 Pandemic. J Urol. 2021 Jan;205(1):241-247.

14. Waxman S, Garg A, Torre S, Wasty N, Roelke M, Cohen M, Salemi A. Prioritizing elective cardiovascular procedures during the COVID-19 pandemic: The cardiovascular medically necessary, time-sensitive procedure scorecard. Catheter Cardiovasc Interv. 2020 Nov;96(6):E602-E607.

15. Prachand V, Angelos P, Gundeti MS, Reid RR, Baroody FM, Slidell MB, Kandel JJ, Prachand V, Baroody FM, Slidell MB, Kandel JJ, Prachand V, Baroody. Prioritization and Time to Surgery. Procedures During COVID-19: Patient and Adm. Recommendations and Individual Surgeon Prioritization Systems for Reinstating the COVID-19 postlockdown: An Italian Study in South Korea. J Clin Med. 2021 Aug;10(16):3522.

16. Marfori CQ, Kiebannof JS, Wu CZ, Barnes WA, Carter-Brookes CM, Amdur RL. Reliability and Validity of 2 Surgical Prioritization Systems During the COVID-19 Pandemic: Nonemergency Benign Gynecologic Surgery during the COVID-19 Pandemic. J Minim Invasive Gynecol. 2021 Apr;28(4):838-849.

17. Prabhakar SM, Decruz J, Kunnasegaran R. The MeNT-OS Score for Orthopaedic Surgery: An Objective Scoring System for Prioritisation of Orthopaedic Elective Surgeries During a Pandemic. Indian J Orthop. 2021 Mar;55(Suppl 2):1-9.

18. Teja S, Mann C, Hooper P, Buys Y, Yin VT. The Canadian Ophthalmology Society's adaptation of the Medically Necessary, Time-sensitive Surgical Procedures triage and prioritization tool. Can J Surg. 2021 Feb;63(1):E48-E50.

19. Soler E, Farah SN, Bustos VP, Medina SEM, Gómez JF, Lema EM, Moreno CA. Experience of clinical screening for COVID-19 among patients undergoing elective orthopedic surgeries: an alternative proposal. J Orthop Surg Res. 2021 Feb;16(1):103.

20. Cohn JA, Ghiraldi EM, Uzzo RG, Simhan J. A Critical Appraisal of the American College of Surgeons Medically Necessary, Time Sensitive Procedures (MeNCTS) Scoring System, Urology Consensus Recommendations and Individual Surgeon Case Prioritization for Resumption of Elective Urological Surgery During the COVID-19 Pandemic. J Urol. 2021 Jan;205(1):241-247.

21. Waxman S, Garg A, Torre S, Wasty N, Roelke M, Cohen M, Salemi A. Prioritizing elective cardiovascular procedures during the COVID-19 pandemic: The cardiovascular medically necessary, time-sensitive procedure scorecard. Catheter Cardiovasc Interv. 2020 Nov;96(6):E602-E607.
38. Dumitrascu MC, Sandru F, Carsote M, Petca RC, Gheorghisan-Galateanu AA, Petca A, Valea A. Anorexia nervosa: COVID-19 pandemic period (Review). Experimental and Therapeutic Medicine 2021;22(804):1-5.

39. Chen X, Wang L, Liu L, Jiang M, Wang W, Zhou X, Shao J. Factors associated with psychological distress among patients with breast cancer during the COVID-19 pandemic: a cross-sectional study in Wuhan, China. Support Care Cancer. 2021 Aug;29(8):4773-4782.

40. Scappaticcio L, Maiorino MI, Iorio S, Camponovo C, Piccardo A, Bellastella G, Docimo G, Esposito K, Trimboi P. Thyroid surgery during the COVID-19 pandemic: results from a systematic review. J Endocrinol Invest. 2021 Jul 19:1-8.

41. COVID Surg Collaborative. Head and neck cancer surgery during the COVID-19 pandemic: An international, multicenter, observational cohort study. Cancer. 2021 Jul 15;127(14):2476-2488.

42. Šifrer R, Urbančič J, Piazza C, van Weert S, García-Purriños F, Benedik J, Tancer I, Aničin A. Emergent tracheostomy during the pandemic of COVID-19: Slovenian National Recommendations. Eur Arch Otorhinolaryngol. 2021 Jul;228(7):2209-2217.

43. Lin YN, Liu ZR, Li SQ, Li CX, Zhang L, Li N, Sun XW, Li HP, Zhou JP, Li QY. Burden of Sleep Disturbance During COVID-19 Pandemic: A Systematic Review. Nat Sci Sleep. 2021 Jun 28;13:933-966.

44. Valea A, Ghervan C, Carsote M, Morar A, Iacob I, Tomesc F, Pop DD, Georgescu C. Effects of combination therapy: somatostatin analogues and dopamine agonists on GH and IGF1 levels in acromegaly. Clujul Medical. 2015;88(3):310-313.

45. Valea A, Carsote M, Ghervan C, Georgescu C. Glycemic profile in patients with acromegaly treated with somatostatin analogue. J Med Life. 2015;8(Spec issue):79-83.

46. Freer G, Lai M, Quaranta P, Spezia PG, Pistello M. Evolution of viruses and the emergence of SARS-CoV-2 variants. New Microbiol. 2021 Dec 19;44(4).

47. Ljungman P. Infectious complications and vaccines. Hematology Am Soc Hematol Educ Program. 2021 Dec 10;2021(1):587-591.

48. Schumm MA, Pyo HQ, Ohev-Shalom R, Tseng GH, Livhits MJ, Zanocco KA, Hiyama DT, Yeh MW. Patient experience with electronic health record-integrated postoperative telemedicine visits in an academic endocrine surgery program. Surgery. 2021 May;169(5):1139-1144.

49. Cabrera CI, Ning AY, Cai Y, D’Anza B. Systematic Review of Telehealth Cost Minimization for Patients and Health Systems in Otolaryngology. Laryngoscope. 2021 Aug;131(8):1741-1748.

50. Purnell S, Zheng F. Safety of Surgical Telehealth in the Outpatient and Inpatient Setting. Surg Clin North Am. 2021 Feb;101(1):109-119.

51. Saqib SU, Saleem O, Riaz A, Riaz Q, Zafar H. Impact of a global pandemic on surgical education and training- review, response, and reflection. J Pak Med Assoc. 2021 Jan;71(Suppl 1)(1):S49-S55.