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Reviewer A

The authors present the results of the Nationwide Inpatient Sample (NIS) when the State Independent Database (SID) examining the relationship between surgeon volume and lateral neck dissection complication rates. Using the NIS, the authors found that as volume increase, complication rates also increase. They found no volume correlate using the SID.

Comment 1. Methods: Radical neck dissection for SCC is a very different operation from a modified lateral neck dissection for thyroid cancer, with the later needing the surgeon to take care to preserve structures that would be otherwise sacrificed. The analysis for surgeon volume should exclude neck dissection for SCC. Or compare complications rates of modified lateral neck dissections for surgeons who performs radical neck dissections to those who do not. This could be why your complication rates increase with surgeon volume and is worth discussing.

Reply 1: Thank you for addressing the potential bias that may arise from how we chose to calculate a surgeon's baseline volume of neck dissections. We felt that there would be possible confounding in many directions with any method for calculating this value. For instance, if we did not include neck dissections for squamous cell carcinoma, this may exclude the majority of neck dissections performed by a head and neck surgeon with an otolaryngology background that treats SCC, while not significantly affecting the final calculated neck dissection volume for an endocrine surgeon who doesn't treat SCC. Such an approach would likely underestimate an otolaryngology-trained head and neck surgeon's experience in the neck. Certainly a modified radical neck dissection can simplify the procedure, where there is no chance of having a complication code for "nerve injury" from a spinal accessory nerve injury as it is purposefully sacrificed. However, given that the amount of radical neck dissections in the dataset were low, we didn't feel it was necessary for a subgroup analysis.

Changes in the text found in the last paragraph of the Discussion, lines ***: Our analysis used any neck dissection for any pathology (squamous cell carcinoma, papillary thyroid cancer, etc.) to calculate surgeon volume before applying this calculated value to the analysis of complications in neck dissection for thyroid cancer only. Given a low number of radical neck dissections (##), we did not separate modified radical neck dissection from radical neck dissection in the analysis, which could be a possible confounder for complication rates, given that spinal accessory nerve preservations is not required for a radical neck dissection.

Comment 2: Methods: clarify what "nerve injury" refers to when discussing complications. It should include spinal accessory nerve and phrenic, ideally these would be reported separately.

Response 2: Unfortunately, the coding system does not allow us to break down nerve injury into specific nerves (spinal accessory, hypoglossal, marginal mandibular, phrenic, vagus, etc.). This is another weakness of what we could do with the dataset.

Changes in the text found in the last paragraph of the Discussion, lines ***: The coding used

for the dataset didn't categorize nerve injury into the possible nerves to be damaged in a neck dissection (spinal accessory, hypoglossal, phrenic, etc.), leaving us unable to further parse the data into this specific complication.

Comment 3: Discussion comparing complication rates to complication rates of total thyroidectomy is somewhat flawed. Many times patients have modified lateral neck dissection for thyroid cancer having already undergone total thyroidectomy. The neck dissections in this cohort would not all have concurrent thyroidectomy with the way it is described in the methods.

Response 3: We felt that this was an important limitation to state—as you clearly point out from our methods, some patients would just be getting a neck dissection for their thyroid malignancy, while others would be getting a concomitant thyroidectomy. Given that we couldn't parse out the specific nerve injured for the complication code of “nerve injury”, this is a potential source of confounding, as some of the reported nerve injuries could have been recurrent laryngeal nerve injuries from the thyroidectomy, while others could have been spinal accessory nerve injuries from the lateral neck dissection.

Changes in the text: No changes were made for this comment.

Comment 4: Please refer to this manuscript: Sharma RK, Lee J, Liou R, McManus C, Lee JA, Kuo JH. Optimal surgeon-volume threshold for neck dissections in the setting of primary thyroid malignancies. *Surgery*. 2022 Jan;171(1):172-176. doi: 10.1016/j.surg.2021.04.046. Epub 2021 Jul 12. PMID: 34266647.

Response 4:

Changes in the text, please see Discussion paragraph 4, lines ***: Sharma et al performed a different statistical analysis on a New York state database demonstrating high-volume lateral neck dissection surgeons being associated with a statistically lower rate of all-cause complications, but not a statistical difference in lateral neck specific complications *Citation*.

Reviewer B

Further investigative work into the construction of these databases is needed as I am dazzled by the data. The authors should speculate more and offer potential solutions.

Comment 1: Are these records (NIS and SID) public for the general patient population?

Response 1: The NIS is publicly available, and the SID data can be purchased.

Changes in the text, please see Introduction paragraph 2, lines ***: . The NIS is a publicly available data set sourced from the SID, involving most US states and encompassing 5 million to 8 million inpatient discharges from approximately 20% of US hospitals prior to a 2012 overhaul²⁰

Missing data regarding nodal and pathological clearance is a huge setback, as underlined by the authors.

Comment 2: The conclusions in the abstract should match the conclusions of the manuscript.

Response 2: The abstract conclusion has been augmented.

Changes in the text, please see the Abstract's conclusion, lines ***: The Nationwide Inpatient Sample demonstrated increasing complication rates for increasing surgeon volume among

intermediate volume surgeons, while the State Inpatient Database demonstrated no surgeon volume-complication association. Given these disparate results, and further limitations with these databases, conclusions regarding surgical volume and clinical decision making based on these data should be assessed cautiously.