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Letters to the Editor

Re: Each procedure matters: threshold for surgeon volume to minimize complications and decrease cost associated with adrenalectomy

With great interest, we read the article by Anderson Jr, et al on the association of surgeon volume to minimize complications and decrease cost associated with adrenalectomy.[1] The lack of clarity in the definition of a 'high volume' surgeon led the authors to further address this issue. The authors sought to find the threshold annual surgeon volume beyond which there is a least risk of complications. Surgeon volume was used as a continuous non-linear variable in logistic regression with restricted cubic splines to predict inpatient complications after adrenalectomy. It was found that "low volume" surgeons were more likely to experience complications, when low volume was defined as < 6 cases per year.

While this study adds to the growing body of evidence on this subject for other procedures[2,3], there are a few aspects that deserve further consideration. First, the authors used surgeon volume instead of the more commonly used hospital volume for this study. The provider field code in the National Inpatient sample can refer to either individual physicians or groups of physicians.[4,5] It would be interesting to know how the authors accounted for the inconsistent meaning of this variable while calculating surgeon volume. Secondly, annual hospital volume was calculated as the "total volume for a given surgeon divided by the total number of years that surgeon reported doing at least one adrenalectomy in the patient dataset". This definition potentially assumes stability, or at least linearity of surgeon volume over the years, which might not be true in real life.

As a team leader, the treating physician is one of the strongest spokes in the wheel of safe surgery. Thus, physician volume is an important variable. However, surgery is a team effort. An effective team is crucial for communication, early identification of complications, and access to critical related services.[6] Surgeon volumes may change when they join teams or hospitals with higher volume referrals for surgery. In this context, hospital volume instead of surgeon volume might be more relevant to the policymaker. The use of hospital volume will also avoid the inconsistent meaning of the provider field code in the National Inpatient sample. Notwithstanding, this timely study is a step in the right direction, and will help the referring physicians, as well as the policymakers to make informed decisions.

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Reply: Each procedure matters: threshold for surgeon volume to minimize complications and decrease cost associated with adrenalectomy

We appreciate the interest that Arora et al had in our manuscript defining the threshold of surgeon volume for adrenalectomy.[1] This study was based on data from 6712 adrenalectomies captured in the Health Care Utilization Project-National Inpatient Sample (HCUP-NIS) database. In their letter, the authors raised concerns about the use of surgeon volume instead of hospital volume to identify a threshold associated with improved patient outcomes and decreased hospital costs. The authors are correct that hospital volume is an important measure for complex operations (like the Whipple procedure) that are at increased risk for complications.[2] Outcomes for these complex procedures are not only dependent on surgeon expertise but also require a hospital system that quickly and effectively recognizes and treats complications. There is evidence that high-volume hospitals are more likely to rescue patients from complications after complex procedures than low-volume hospitals.[3] Outcomes after adrenalectomy, however, appear to be more dependent on surgeon expertise than agile hospital systems. A study by Park et al of 3144 patients undergoing adrenalectomy in the HCUP-NIS evaluated the association between both hospital and surgeon volume and patient outcomes.[4] A multivariate analysis adjusting for patient and provider characteristics revealed that adrenalectomy by low-volume surgeons (bottom quartile/<4 cases/year) was associated with a greater risk of complications (OR 1.5, $P = .002$) than when the procedure was performed by high-volume surgeons; however, there was no association between hospital volume for adrenalectomy and risk of complications.

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In our study, we found that surgeon and hospital volumes were collinear. We believe that this relationship is most likely because a select group of surgeons at each hospital performs the majority of the adrenalectomies. Based on the presence of collinearity between surgeon and hospital volume and the aforementioned study, we selected to evaluate surgeon volume and then adjust the analysis for hospital-level covariates, including hospital location, hospital region (urban/rural), and hospital type (teaching/non-teaching). Statistical models were also built in the generalized framework of the estimating equations to account for the correlation of patients treated at the same hospital. In order to account for the inconsistency of the provider/surgeon variable in the HCUP-NIS database, states/years where a unique surgeon identifier was not available were excluded from the study, leaving only states where a unique surgeon identifier was available and could be tracked between hospitals and over the duration of the study.[5] Because HCUP-NIS is a sample of all inpatient admissions, it is possible that a surgeon may not appear in the database for some years but be present for other years. A surgeon's absence from the database for a specific year does not indicate that that surgeon did not perform any adrenalectomies that year. Therefore, annual surgeon volume was calculated as the total number of adrenalectomies performed by a given surgeon divided by the total number of years that surgeon reported performing at least one adrenalectomy in the HCUP-NIS instead of dividing by the total number of years of observation in the study, which could grossly underestimate the true annual volume for a given surgeon.

In conclusion, this nationwide study from the HCUP-NIS database emphasizes the importance of surgeon volume and its association with patient outcomes from adrenalectomy. While this finding has been demonstrated in previous reports, ours goes further by identifying a volume threshold which can inform referring physicians, surgeons, and patients seeking to optimize outcomes.

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Active surveillance for micro-papillary thyroid carcinoma: who are candidates, how should they be followed, when should they be treated, and what are the clinical and pathologic outcomes after delayed intervention

To the Editors:

We read with interest the commentary by Shaha and Tuttle.[1] Active surveillance (AS) is an established treatment option for patients with localized, low-risk papillary microcarcinoma (PMC). Utilization of AS for selected low-risk cancers is increasing as is considered appropriate for low-risk prostate cancer and on occasion in breast cancer and small renal neoplasms.[2] AS entails the postponement of immediate therapy with the option of delayed intervention if or when the disease progresses. AS is required because of overdiagnosis, along with our inability to predict accurately individual PMC behavior.[3]

The specific rate of clinical progression and need for treatment after active surveillance is still under scrutiny. Because low-risk papillary PMC represents a broad spectrum of disease biology, there is a critical need to define the criteria that will enable both patient and physician to accept AS as the best balance of competing risks. Optimal selection criteria for AS remain undefined and questions remain on how best to include typical patients with low-risk papillary PMC disease. Patient selection for AS is the first mandatory step to address progression. Thyroid cancer is very common, and many localized neoplasms are nonaggressive. Determining which low-risk papillary PMCs are aggressive is important for choosing the most appropriate treatment (eg, surgery, AS). Reliable clinical risk stratifications are known in forecasting the prognosis of groups of patients with similar clinical and pathologic characteristics, but residual uncertainty exists at the individual level.[4,5] Prognostic tools to guide clinical decision-making and avoid overtreatment of indolent PMC and undertreatment of aggressive disease are needed. PMC has a propensity to be multifocal with several different foci per gland. The multifocal propensity of PMC; the increase in thyroid-stimulating horomone; and genomic, molecular-based support for determining PMC aggressiveness all have the potential to affect clinical decision-making for how to best follow-up or intervene surgically. Incorporating information from advanced imaging kinetics and biomarker technology will likely individualize future treatment decisions while improving overall strategies of surveillance.[1-6]

Adherence to AS protocols is critical in making sure patients are monitored well and treated early when progression occurs. Before deciding to adopt AS and during ongoing active surveillance, methods involving sequential clinical and imaging evaluation, thyroid-stimulating horomone, factors present on biopsies, and genetic markers should be evaluated to determine clinical progression and/or identify those at risk for progression.

A measure of uncertainty and fear of progression will always accompany patients undergoing AS, as well as the physicians treating them. The variety of AS protocols and lack of robust evidence make firm conclusions difficult. Currently, patients and clinicians must decide the balance of risks and benefits in AS protocols. The publication of robust evidence from randomized trials and longer-term follow-up of cohorts is required.

More research is necessary to reliably quantify the health benefits; define appropriate candidates for AS; and account for patient preferences, how to follow them, when to treat, and what the clinical and pathologic outcomes are after delayed operative intervention.

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