Pathological Review of Turbinate Tissue from Functional Nasal Surgery: Incurring Costs without Adding Quality

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No sponsorships or competing interests have been disclosed for this article.

Abstract

Objective. Inferior turbinate surgery for nasal obstruction can be performed in a variety of ways. Only a few of these methods produce tissue that can be sent for pathologic analysis. According to the College of American Pathologists, turbinate tissues are not exempt from requisite pathologic evaluation. Our objectives were to evaluate the clinical value and cost implications of routine pathological examination of turbinate specimens.

Study Design. Case series with chart review.

Setting. Academic tertiary care medical center.

Subjects and Methods. Charts of patients who underwent an inferior turbinate procedure for nasal obstruction between January 2008 and August 2011 were reviewed.

Results. Thirteen hundred consecutive cases from 17 surgeons were identified. Among these patients, 223 (17%) underwent an isolated turbinate reduction procedure and 779 (59%) underwent a reduction procedure in conjunction with a septoplasty. The remaining patients had a turbinate procedure in addition to another head and neck procedure. Only 591 (45%) turbinate reduction procedures were performed by methods that were tissue producing, and of these, 137 (23%) were sent for pathologic analysis. All submitted specimens received a gross examination and 123 (90%) also underwent histologic analysis. No abnormalities were reported.

Conclusion. At our institution, most surgeons did not submit turbinate tissues for pathologic examination even when a specimen was produced. Of the specimens sent, no abnormal pathologic results were identified. Our results suggest that routine pathologic evaluation of inferior turbinate specimens may not contribute to patient care and perhaps represents an unnecessary cost.

Keywords
turbinoplasty, turbinate reduction, turbinate pathology, financial analysis, nasal obstruction, turbinate specimen, septoturbinoplasty, submucosal resection of turbinates

Introduction

The current trends in health care reform have demonstrated a transition from a fee-for-services payment model to a bundled or episode-of-care model. A bundled payment is a fixed price, set in advance, for all health care services that are related to a single episode of care. An episode of care includes all clinically related services for a specific medical condition from the time of presentation to completion of treatment. The goal of this model is to encourage hospitals and physicians to work together to coordinate care, improve care transitions, and ensure appropriate care after discharge. In light of this and other changes, it is prudent for health care systems to evaluate their practices in order to identify cost-reducing opportunities while maintaining a high standard of care.

One way of eliminating unnecessary costs is to eliminate unnecessary testing. Submitting tissues removed from the body for pathological examination is analogous to performing a test. Over the past few years, the Head & Neck Institute at the Cleveland Clinic has been reviewing its practices and has determined that for certain instances, routine submission of body tissue for pathological examination could be avoided. This was demonstrated in our prior work, which challenged the clinical utility of submitting septoplasty specimens removed during surgery for nasal obstruction. The elimination of this test was projected to decrease...
charges by $131,580 over a 2-year period at our institution.\textsuperscript{1} Along these lines, it stands to reason that other normal tissues generated during surgery for nasal obstruction could also be eliminated from pathological review. A prime example is inferior turbinate tissue.

Inferior turbinate hypertrophy is one of the most common causes for nasal obstruction. It can lead to many unfavorable sequelae, such as mouth breathing, hyponasal speech, and sleep disturbances—all of which have been shown to have a negative effect on quality of life.\textsuperscript{2,4} This form of obstruction can be resolved with a wide variety of turbinate reduction procedures, which are among the most common surgical procedures performed by otolaryngologists. These include inferior turbinate outfracture, partial turbinectomy, radiofrequency ablation, intramural cautery, and submucosal resection. It is notable that some of these procedures result in tissue being removed from the body, whereas others do not.

The handling of specimens removed during procedures that generate tissue is based on the recommendations of the College of American Pathologists (CAP). In contrast to septoplasty specimens, which the CAP recommends may be reviewed “at the discretion of the pathologist,” inferior turbinate tissues are not specifically addressed.\textsuperscript{5} Consequently, most hospital policies do not make exemptions for turbinate tissues and require them to be submitted for pathologic review.

It is arguable that the clinical value of inferior turbinate specimens undergoing pathological evaluation is no different from that of septal bone and cartilage. As septoplasty and turbinate procedures are largely performed concomitantly, the goal of this study was to investigate the clinical utility and cost implications of routine pathological examination of turbinate specimens obtained during surgery performed for nasal obstruction.

**Materials & Methods**

This study was a chart review approved by the Cleveland Clinic Institutional Review Board. Our database was searched for turbinate procedures by CPT codes (30130, 30140, 30801, 30802, and 30930) performed between January 2008 and August 2011 at the Cleveland Clinic. Information recorded included primary surgeon, location of surgery, concomitant procedures performed along with inferior turbinate resection, whether all the tissue specimens were sent to pathology, type of pathological examination performed on the inferior turbinate tissue (gross or histologic), and the reported pathologic findings.

**Tissue Processing**

The method of processing each specimen for pathology at our institution has been described previously by Haffey et al.\textsuperscript{1} Briefly, the specimen has to be hand delivered by a nurse or surgical scrub technician to the central pathology department. If a specimen is collected at an Ambulatory Surgical Center/Regional Site, a courier is required to transport the specimen to the central pathology department.

Once the specimen is received in the pathology department, it is given a surgical pathology number and taken to the “grossing” table for qualitative description. Measurements are taken and a gross report is generated. If the specimen is to undergo histologic analysis, it must first undergo decalcification, which can take several hours to a day. It is then placed in a paraffin block from which slides are prepared. The slides are then analyzed by the pathologist and a report is generated. Following analysis, the gross specimens are stored in a facility for a discrete period of time, whereas the histologic specimens are stored indefinitely.

**Financial Analysis**

To determine the financial implications of current practices, the Cleveland Clinic Foundation Fiscal Services Group conducted an internal review of the costs and the reimbursement associated with inferior turbinate reduction. The payment associated with each procedure can be reported as reimbursement or charges.\textsuperscript{1} Reimbursement represents the internal expenses and the negotiated amount of money that is paid by individual payers to the institution. Charges, on the other hand, represent the amount of money requested by the institution for payment, which is always greater than the reimbursement amount. The exact amount of overestimation of the reimbursement is institution dependent and proprietary information. Therefore, a charge-based analysis was performed for this study.

Charges for any surgical procedure are composed of both professional and technical components. The professional charges related to a turbinate reduction procedure include the fees for the surgeon, anesthesiologist, and pathologist. The remaining charges associated with the procedure, which include operating room costs, supplies, man hours, and so on, are classified as technical charges. Similarly, the submission of turbinate specimens for pathologic analysis also incurs both a professional and a technical charge. The professional charge for pathologic analysis encompasses the pathologists’ professional fee for performing the gross examination or reading the histologic slide. The technical charge encompasses the cost for supplies to process the tissues, lab technicians, and so on.

**Results**

**Clinical**

There were 1300 inferior turbinate operations performed between January 2008 and August 2011 specifically for the indication of nasal obstruction. These operations were performed at the Cleveland Clinic Main Campus and Regional Ambulatory Surgical Centers by 17 different surgeons.

Inferior turbinate surgery was performed as a solitary procedure in only 223 (17%) cases. The remaining 1077 (83%) cases of turbinate procedures were performed concurrently with another procedure. The most common concurrent procedure was a septoplasty, which was performed in 772 (59%) cases. All of these septoplasty procedures were performed for nasal obstruction. Two hundred fifteen (17%) turbinate procedures were performed with endoscopic sinus
surgery cases (with or without other associated procedures). The remaining turbinate procedures were performed with a wide variety of procedures including a tonsillectomy and adenoidectomy.

More than half of the procedures that were employed for inferior turbinate surgery were non-tissue producing in nature (709 cases or 54.5%) and therefore did not generate any specimen. The remaining procedures (591 cases or 45.5%) did result in tissue being removed from the patient. Of these tissue-producing procedures, 454 specimens (77%) were discarded at the discretion of the surgeon and only 137 (23%) specimens were submitted to pathology. All of these submitted specimens were examined grossly, and it is surprising that the large majority (123 cases or 90%) underwent histological examination as well. No significant pathologic abnormalities were reported in any of the turbinate specimens examined. The only reported findings were “chronic inflammatory tissue” and “normal turbinate tissue,” neither of which had any bearing whatsoever on patient care.

Financial Charges

The professional charges that were associated with inferior turbinate surgery amounted to 33% of the total charges, whereas the technical charges represented 67% (Figure 1). Per patient, the combined professional and technical charges for pathologic analysis made up 2% ($212) of the overall $14,379 associated with inferior turbinate surgery.

Discussion

This series represents the largest study evaluating the value of routine pathologic analysis of inferior turbinate specimens, specifically in the setting of nasal obstruction. Exploring techniques of improving quality while reducing costs in health care is an important trend in medicine—one that has also started to make its way into otolaryngology. Our prior work, which inspired the current study, describes the lack of clarity on existing guidelines and policies on the routine submission of nasal specimens removed for obstruction. First, the most commonly performed turbinate procedures do not actually remove tissue and thus do not result in a specimen. Second, even when a tissue-producing technique was employed, most surgeons did not routinely submit the specimen to pathology for review. This unexpected finding nicely illustrates that surgeons may not be concerned about the results of a pathological analysis of turbinate tissues. It also might reflect a lack of clarity on existing guidelines and policies on the handling of human tissues, given that our interpretation of the CAP guidelines would require these tissues to be submitted. Finally, any specimens that were submitted and examined pathologically showed no abnormalities and the results of the analysis did not contribute to medical decision making or patient care.

From a financial standpoint, the combined professional and technical charges for pathologic analysis amounted to approximately $200 per patient. To put this in perspective, if all 1300 patients in our study had received pathologic analysis of their turbinate specimens, this would equate to $275,600 in charges. As highlighted in our prior work, the charges associated with submitting a septal specimen from a septoplasty are approximately $250. It is interesting that the cost of sending both the septal specimens and inferior turbinate specimens is not additive, as both tissues are from the same body location and require the same preparation for pathology review. Therefore, even if septal specimens are not sent for pathologic review, there is no money saved as the turbinate specimens incur almost a similar charge if they are sent. In other words, an actual savings would occur only if there is no specimen sent at all. This, in large part, was the impetus for the present study, given that septoplasty and turbinate procedures are generally performed concurrently.

An alternate way of examining the financial data is to consider the charges as direct and indirect costs. The direct costs denote the expenses of the personnel and materials required to provide the care, such as lab technicians, surgical staff, operating room technicians, reagents, specimen containers, and so on. The indirect costs, on the other hand, refer to all the overhead expenses of the Cleveland Clinic enterprise, such as heat, electricity, security, marketing, facilities, finance, and so on. A certain amount of these expenses is ascribed to everything that is billed. Both direct and indirect costs are factored into the professional and technical charges displayed in Figure 1.

The discussion thus far of cutting charges by eliminating the submission of turbinate specimens refers to the
reduction of direct expenses. Decreasing indirect costs is not as straightforward as decreasing direct costs. A certain number of specimens would need to be eliminated from being sent to pathology before we could realize this element of the savings. The reason is that sending 1 less specimen would still require essentially the same amount of resources. Thus, to truly cut indirect costs, a specific number of specimens would need to be eliminated from being sent to pathology in order to eliminate some of the associated personnel and facilities costs. This is referred to as a step function, whereby only with a decrease in x would there be a decrease in indirect costs.

The pertinence of these finances becomes even more relevant when considering the amount of reimbursement received from the payer. With the episode of care model, which is transitioning to the more dominant form of reimbursement, the onus is on the hospital to maintain a profit margin by decreasing internal expenses. In theory, this system functions to lower health care expenses by producing something analogous to a hospital budget under which the facility is expected to deliver all of its care. Therefore, any cost-saving initiatives that do not affect patient care would translate to a favorable financial outcome by directly improving the bottom line.

Aside from the additional cost associated with the routine submission of inferior turbinate specimens, there is the added factor of it being an inconvenient use of already limited resources. Not only did each specimen require a specimen container, labels, courier service to take the sample to the central pathology lab, and so on, 90% of them also required special stains and preparation to be examined histologically. These slides are then required to be stored indefinitely, even though they are rarely reviewed again. Furthermore, the nurse who labels the specimen container, the technician who prepares the slides, and the pathologist who reviews these slides are all pulled away from other duties that they could otherwise be performing. This exercise of diverting resources from other useful enterprises that may have a more beneficial effect on patient care demonstrates the added strain that this process has on the health care system.

It is important to stress that our focus is on cases of inferior turbinate reduction performed only for nasal obstruction. All of these patients had a thorough physical examination with nasal endoscopy prior to surgery, which ruled out concerns for anything sinister. To our knowledge, the presence of a sinister process like a neoplasm in the setting of an unremarkable history and physical exam has not been described in the literature. As a result, it is difficult to ascertain the associated health consequences and costs of a missed lesion that could result from not sending a turbinate specimen that actually contained an unexpected lesion. The few isolated case reports that do exist of serious processes involving the inferior turbinate(s) are all cases in which the patients presented with unilateral nasal obstruction and/or epistaxis on history and also had a clear mass or marked asymmetry of the involved turbinate on clinical exam.7-10

Needless to say, if any abnormality of the turbinate is suspected or if the patient has a history of malignancy, careful evaluation and pathologic evaluation of all tissues removed during biopsy/turbinate surgery are strongly recommended.

This study takes an important first step in an area that will quickly become vital to survival in the modern health care environment—reviewing policies to address gaps where unnecessary costs are incurred without any benefit to the quality of care delivered.

Specifically, our results and our clinical experience suggest that the routine pathological evaluation of inferior turbinate specimens removed during surgery for obstruction does not appear to be contributing to patient care. By not sending the turbinate specimens to pathology, there is a cost savings that can be realized. Even though the amount saved may seem small, these small incremental changes can have a substantial effect on the financial bottom-line across an entire health care system.

Conclusion

Routinely submitting inferior turbinate tissue that is removed during surgery performed for nasal obstruction for pathologic examination incurs costs and does not appear to improve quality of patient care. Such testing represents an added burden to an already strained health care system and should perhaps be reconsidered.

Acknowledgment

The authors wish to acknowledge Ben Kimmel from the Cleveland Clinic Foundation Fiscal Services Group for his assistance with the financial review and analysis.

Author Contributions

Karthik Rajasekaran, contribution to conception and design, acquisition of data, analysis of data, drafting and revision of article, final approval; Timothy Haffey, contribution to conception and design, acquisition of data, critical revision, final approval; Ashleigh Halderman, conception and design, interpretation of data, revision of article, final approval; Aaron P. Hoschar, analysis and interpretation of data, critical revision, final approval; Raj Sindwani, contribution to conception and design, analysis and interpretation of data, critical revision, final approval.

Disclosures

Competing interests: None.
Sponsorships: None.
Funding source: None.

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