Our Surgical Experience: Open Versus Endoscopic Carpal Tunnel Surgery

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Carpal tunnel release is one of the most common hand operations in the United States and every year approximately 500,000 patients undergo surgical release. In this article, we examine the argument for endoscopic carpal tunnel release versus open carpal tunnel release, as well as some of the literature on anatomical variants in the median nerve at the wrist. We further describe the experience of several surgeons in a large academic practice. The goals of this article are to describe key anatomic findings and to present several cases that have persuaded us to favor offering patients open carpal tunnel release. *(J Hand Surg Am. 2018;■(■):■−■. Copyright © 2018 by the American Society for Surgery of the Hand. All rights reserved.)*

Key words Carpal tunnel surgery, hand surgery, open carpal tunnel, endoscopic carpal tunnel.

FOR DECADES, SURGEONS HAVE TRIED to improve carpal tunnel release (CTR), which has resulted in multiple techniques and lack of clarity on the optimal strategy. Many variations have been described, from open to mini-open, to ultrasound-guided and endoscopic, single-port or 2-port.[1−3] One study asked surgeons which they performed; 52% used open, 36% used mostly endoscopic, and 12% used both approaches.[4] A recent meta-analysis demonstrated equivalent symptom relief for open carpal tunnel release (OCTR) versus endoscopic carpal tunnel release (ECTR) and showed that ECTR resulted in better recovery and earlier return to work and (possibly) was safer than OCTR.[5] Many studies (prospective, retrospective, and controlled) have advocated similar support for ECTR and have suggested that early satisfaction rates are high but late satisfaction is no different,[6] and that more long-term studies and required. One randomized trial offered patients with bilateral carpal tunnel syndrome one technique on the first hand and the other technique on the second hand. There was no difference in outcomes, although there was a slightly higher patient satisfaction score with ECTR.[7] The best long-term outcome study comparing OCTR and ECTR evaluated early and long-term (12-year) follow-up and showed no difference in symptoms or outcomes.[8]

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Received for publication March 10, 2017; accepted in revised form March 18, 2018.

No benefits in any form have been received or will be received related directly or indirectly to the subject of this article.

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0363-5023/18/■ ■-0001$36.00/0
https://doi.org/10.1016/j.jhsa.2018.03.029

COST ANALYSIS: ENDOSCOPIC VERSUS OPEN AND HOSPITAL VERSUS AMBULATORY SURGERY CENTER VERSUS CLINIC

A recent study highlighted the cost of OCTR versus ECTR performed in the clinic versus operating room.[9] They found operating time to be 60 minutes in the operating room and 30 minutes in the clinic, and that the opportunity cost of using the operating room was approximately $2,700. The cost per patient in the clinic was $985 for ECTR versus $670 for OCTR. In the operating room, endoscopic surgery was cheaper, $2,273 versus $3,469. The true profit margin per patient was $2,710 for clinic single-port versus $1,186 for clinic open carpal tunnel, and performing

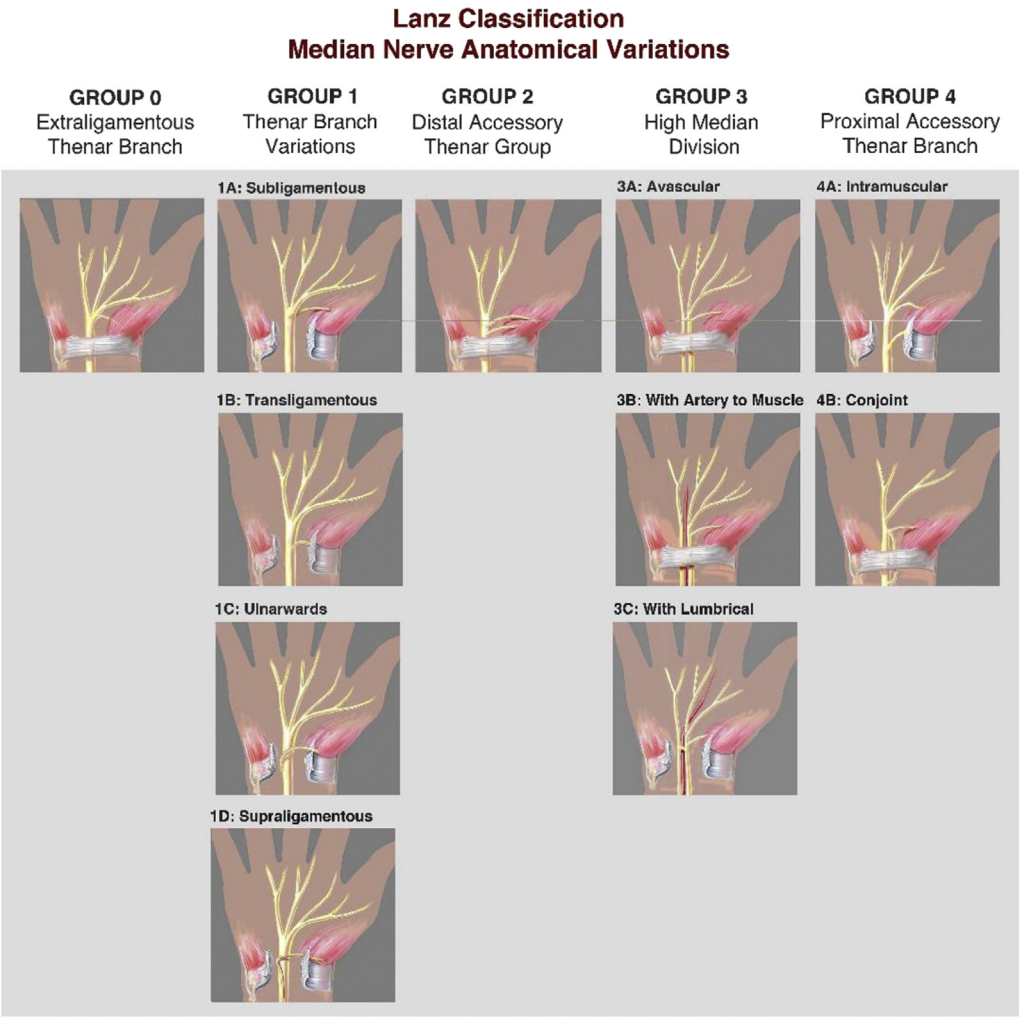

FIGURE 1: Schematic of the different nerve courses (Lanz types).

this surgery in the operating room resulted in a loss of $1,562 for single-port versus $3,349 for OCTR. In the discussion, Chatterjee et al[9] stated this likely resulted from inefficiency in turnaround time in the operating room as well as the necessity of anesthesia. Leblanc and Lalonde[10] found similar results, although they were looking at OCTR. Within a 3-hour block time, they could perform 4 CTRs in the operating room compared with 9 in the clinic, and the total cost per CTR in the operating room was $137 compared with $36 in the clinic.

Chung et al[11] examined cost, long-term quality of life, and costs of complications. They noted a cost of $2,202 for OCTR versus $2,944 for ECTR. The adjusted cost differential was $46 for ECTR versus OCTR, which included the cost from Medicare relative value units, adjusted for outcomes and those costs.[11] Chung et al acknowledged differences in quality of life by decade for patients, meaning that benefits for endoscopic surgery are higher for younger patients. There was a marginal benefit (for all age groups) of cost for ECTR versus OCTR, which was feasible in the hypothetical case in which the rate of median nerve injury was 1% lower for ECTR versus OCTR surgery (this has not been reported in the literature).

Vasen et al[12] acknowledged societal costs associated with ECTR versus OCTR and cited complication rates of 5% for ECTR versus 0.1% for OCTR and the return to work time of 28 days for ECTR versus 54 for OCTR. They presented an algorithm highlighting the cost of outcomes, from $6,288 for an open surgery without complication to $701,609 for an endoscopic surgery that resulted in severe nerve laceration. The total cost for ECTR was $5,896 versus $6,315 for OCTR. If the recovery time for OCTR were 10 days shorter, the costs of OCTR would be dramatically lower compared with ECTR.

Another landmark article on cost examined a cohort from the National Survey on Ambulatory