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Interhospital vascular surgery transfers to a tertiary care hospital

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ABSTRACT

Objective: Interhospital transfers (IHTs) to tertiary care centers are linked to lower operative mortality in vascular surgery patients. However, IHT incurs great health care costs, and some transfers may be unnecessary or futile. In this study, we characterize the patterns of IHT at a tertiary care center to examine appropriateness of transfer for vascular surgery care.

Methods: A retrospective review was performed of all IHT requests made to our institution from July 2014 to October 2015. Interhospital physician communication and reasons for not accepting transfers were reviewed. Diagnosis, intervention, referring hospital size, and mortality were examined. Follow-up for all patients was reviewed.

Results: We reviewed 235 IHT requests for vascular surgical care involving 210 patients during 15 months; 33% of requested transfers did not occur, most commonly after communication with the physician resulting in reassurance (35%), clinic referral (30%), or further local workup obviating need for transfer (11%); 67% of requests were accepted. Accepted transfers generally carried life- or limb-threatening diagnoses (70%). Next most common transfer reasons were infection or nonhealing wounds (7%) and nonurgent postoperative complications (7%). Of accepted transfers, 72% resulted in operative or endovascular intervention; 20% were performed <8 hours of arrival, 12% <24 hours of arrival, and 68% during hospital admission (average of 3 days); 28% of accepted patients received no intervention. Small hospitals (<100 beds) were more likely than large hospitals (>300 beds) to transfer patients not requiring intervention (47% vs 18%; $P = .005$) and for infection or nonhealing wounds (30% vs 10%; $P = .013$). Based on referring hospital size, there was no difference in IHTs requiring emergent, urgent, or nonurgent operations. There was also no difference in transport time, time from consultation to arrival, or death of patients according to hospital size. Overall patient mortality was 12%.

Conclusions: Expectedly, most vascular surgery IHTs are for life- or limb-threatening diagnoses, and most of these patients receive an operation. Transfer efficiency and surgical case urgency are similar across hospital sizes. Nonoperative IHTs are sent more often by small hospitals and may represent a resource disparity that would benefit from regionalizing nonurgent vascular care. (J Vasc Surg 2018;67:1829-33.)

Regionalization of specialized vascular care has increased the volume of patients requiring interhospital transfer (IHT) for evaluation and treatment. Patients undergoing IHT in the United States for intact abdominal aortic aneurysm repair have more than doubled.[1] In Canada, IHTs for emergent vascular surgery overall have increased by >500% in the last 10 years.[2]

Although IHT is an important tool for connecting patients with appropriate care, it is a costly resource. Patients transferred to tertiary hospitals have been shown to consume more hospital resources compared with those directly admitted regardless of age, sex, and diagnosis.[3] To relieve our increasingly overburdened health care system, hospitals, and medical providers, it is imperative that IHT be used with discretion.

The first step in effective use of resources is understanding the body of vascular patients undergoing IHT. In this study, our objective was to investigate the pattern of IHT for vascular surgery patients to our institution and to examine the appropriateness of transfer within our system.

METHODS

The Institutional Review Board at our institution approved this study. As this was a retrospective review that posed minimal risk and would not adversely affect the welfare of the participants, a waiver of consent was granted.

Recruitment and population. IHT requests at our institution have been recorded through an emergency department services transfer center since January 2012. The information technology manager of emergency

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medicine queried the database for IHTs in which the vascular surgery division was the intended recipient service and provided the authors with a list of patient names, medical record numbers, transfer hospital, accepting surgeon, and patient disposition. All patients who were involved in a request for transfer were included in this study. This includes transfer attempts that did not result in transfer.

Acceptance. The protocol for discussing referrals requires physician-to-physician communication, and the decision to accept the transfer is performed on a case-by-case basis. There currently is no algorithm for accepting or rejecting referrals.

Imaging. Our transfer center facilitates communication between physicians and arranges Digital Imaging and Communications in Medicine imaging transfer when it is available. Our center uses IMPAX (Agfa HealthCare, Carlstadt, NJ). Image availability for transfers was reviewed.

Chart review. Chart review using Epic medical records was conducted to obtain information about patients involved in transfer requests. The result of the transfer request was reviewed. Demographic information including age, sex, and insurance type was collected. Diagnosis of completed transfer patients was evaluated, as was type of intervention performed once the patient was transferred. We also collected information on the transfer hospital including the number of beds and the time it took for the transfer to occur. Transfer time is defined as the time elapsed between the patient's leaving the referring hospital and arriving to the destination hospital. This is relevant because delays in transfer time may serve as a proxy for the efficiency of the transfer process. Finally, we examined mortality rates of transferred patients.

RESULTS

From July 2014 to October 2015, there were 235 requests for transfer; 78 (33%) requests did not result in transfer. Of the requests that did not result in transfer, 35% stayed at the referring facility after reassurance from the consulted physician, 30% were offered clinic referral, and 11% had need to transfer obviated by further local workup. Of those patients who were offered clinic referral, 60% ultimately followed up in our clinic. Of the remaining patients not transferred, 7% of patients underwent further nonsurgical treatment at the local institution, 6% of patients or patients' families refused to transfer, and 6% were referred to another service. Information was not available for the remaining 5%.

Of the 233 requested transfers, 102 images were shared digitally with our system from the outside hospital. Of 154 completed transfers, images were shared in 75. Of the remaining transfers, 48 were accepted on the basis of clinical description and no images were specifically requested. In only five instances was there documentation definitively stating that images were requested but not able to be shared. Two of these instances were from the same small regional hospital, and the remaining three were of duplex ultrasound images that were available only on a proprietary imaging system. Of the 25 requested transfers that involved the thoracic or abdominal aorta, 20 transfer requests shared images with our institution. We did not encounter a case in which inability to share imaging resulted in an aborted transfer.

ARTICLE HIGHLIGHTS

- **Type of Research:** Retrospective single-institution cohort study
- **Take Home Message:** Of 235 interhospital transfer (IHT) requests for vascular surgical care of 210 patients during 15 months, 70% of the accepted IHTs were for life- or limb-threatening diagnoses that required surgery, and 28% of transfers were nonoperative and were more often sent by small hospitals.
- **Recommendation:** This study suggests that admitting nonoperative IHTs, sent more often by small hospitals, may represent a resource disparity that would benefit from regionalizing nonurgent vascular care.

The mean age of patients transferred was 61 years (standard deviation, 18.02 years), and 63% were men. The average distance of hospitals was 86 miles (standard deviation, 72.73 miles). There was no significant difference in age, gender, referring hospital size, or hospital distance between requests that were accepted and requests that were not accepted (Table).

Most requests, 154 (67%), resulted in completed transfer. Diagnoses ranged from ruptured abdominal aortic aneurysm to infected chronic ulcers (Fig). Diagnoses considered life or limb threatening composed the largest share of transfer requests, 70%. The next most common diagnoses were infection or nonhealing wounds and nonurgent postoperative complications, both at 7%.

Of the transfer requests completed, 72% resulted in a procedure or surgical intervention. Of these, 20% of interventions occurred within 8 hours, 12% occurred between 8 and 24 hours, and the majority at 68% occurred at some point during admission.

There was information about specialty of the referring provider for 117 cases. Most referrals came from emergency department physicians at 76%, and 70% of these referrals were accepted. The rest of the providers included 6% primary care, 5% vascular surgery, 4% general surgery, and 3% midlevel providers. Primary care providers had the lowest acceptance rate at 43%. Vascular surgery, general surgery, and midlevel providers

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