Open and endovascular aneurysm repair in the Society for Vascular Surgery Vascular Quality Initiative

Emily L. Spangler, MD *and* **Adam W. Beck, MD,** *Birmingham, AL*

The Society for Vascular Surgery Vascular Quality Initiative is a patient safety organization and a collection of procedure-based registries that can be utilized for quality improvement initiatives and clinical outcomes research. The Vascular Quality Initiative consists of voluntary participation by centers to collect data prospectively on all consecutive cases within specific registries which physicians and centers elect to participate. The data capture extends from preoperative demographics and risk factors (including indications for operation), through the perioperative period, to outcomes data at up to 1-year of follow-up. Additionally, longer-term follow-up can be achieved by matching with Medicare claims data, providing long-term longitudinal follow-up for a majority of patients within the Vascular Quality Initiative registries. We present the unique characteristics of the Vascular Quality Initiative registries and highlight important insights gained specific to open and endovascular abdominal aortic aneurysm repair. (Surgery 2017;■:■-■.)

From the Division of Vascular Surgery and Endovascular Therapy, Department of Surgery, University of Alabama at Birmingham, Birmingham, AL

The Society for Vascular Surgery (SVS) Vascular Quality Initiative (VQI), in its role as a registry of contemporary vascular practice across the nation, serves as an important resource for identifying variation in clinical practice and areas for quality improvement, extending through all phases of care from preoperative to long-term follow-up in patients treated for a variety of indications. Outside of trial infrastructure, the VQI is the only large-scale operative database designed specifically and exclusively for data collection on vascular procedures. This review summarizes key contributions toward the body of knowledge around open and endovascular abdominal aortic aneurysm (AAA) repairs from the Society for Vascular Surgery Vascular Quality Initiative and the advantages and limitations of analyses derived from this data source.

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Reprint requests: Emily L. Spangler, MD, Division of Vascular Surgery and Endovascular Therapy, Departmet of Surgery, University of Alabama at Birmingham, 1808 7th Avenue South, BDB 503, Birmingham, AL 35294. E-mail: espangler@uabmc.edu.

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BASIS OF THE VQI

The SVS VQI was launched in 2011 with the infrastructure of a patient safety organization (PSO) to "improve the quality, safety, effectiveness, and cost of vascular health care by collecting and exchanging information."[1] The path to this national vascular database began from a regional quality improvement initiative in New England, the Vascular Study Group of Northern New England in 2001,[2] which was predicated on concepts developed by the Northern New England Cardiovascular Disease Study Group in 1987.[3] Under the Patient Safety and Quality Improvement Act of 2005,[4] data collected as part of the PSO are protected from legal discovery and collection of patient identifiers is allowed without specific investigational review board approval or need for patient consent.[1]

DATA CAPTURE AND REPORTING

The VQI is composed of 12 individual procedural registries, with 3 directed at aortic aneurysm repair, including endovascular and open infrarenal AAA registries, as well as the thoracic and complex endovascular aortic (including branched and fenestrated AAA repair) registry. Participation in each registry is voluntary by subscription, and not all centers participate in all registries. At present, the

VQI consists of 412 participating centers with >3,200 physicians distributed across 18 regional quality groups, including Canada.[5] Physicians contributing include vascular surgeons as well as other specialties (eg, Neurosurgery, General Surgery, Interventional Cardiology, Interventional Radiology, etc.) performing vascular procedures. Through March 2017, this included a total of 363,960 procedures, including 32,485 endovascular AAA repairs (EVAR), and 9,355 open AAA repairs.[6]

Participation in a registry requires data collection on all consecutive cases meeting the registry category definition. Audited institutional claims data are matched to the VQI registry to ensure compliance with consecutive case entry, and missing or inexact matches are sent to the participant for review and reconciliation to help ensure completeness of data on procedures performed.[7] The VQI's prospectively collected data elements are unique among national operative outcomes registries in that the variables and definitions were developed in a directed manner toward the conduct and associated complications of each vascular procedure.[8] In this regard, the database has an unparalleled ability to capture granular anatomic data and device-related data. The VQI also allows for collection of detailed clinical variables with regard to patient preoperative risk, cardiovascular medication use, symptom severity/procedural indications, intraoperative variables, in-hospital postprocedural outcomes, and 1-year follow-up data. The primary assessment is completed during the initial procedural stay. At present, only patients who undergo intervention are captured, although there are ongoing plans to begin collection of medical management of various vascular diagnoses in the near future.

While not the primary role of the VQI, the comprehensive nature of the database also allows for use of the registry as a data repository for pragmatic prospective randomized clinical trials.[9-11] It also is being utilized for Food & Drug Administration-required post-approval surveillance projects.[12] Additionally, the VQI registry data can be used for Centers for Medicare & Medicaid Services Physician Quality Reporting System reporting and for carotid stent reporting to CMS.[13]

For quality improvement purposes, a number of deliverables are provided from the VQI to its constituents to ensure continual performance feedback. Push reports are provided on a surgeon and center level periodically for various performance indicators, including items such as duration of stay after selected procedures, use of statin and antiplatelet medications after discharge, use of chlorhexidine skin prep, and long-term follow-up after procedures. Additionally, Center Opportunity Profile for Improvement reports allow feedback on observed outcomes referenced to risk-adjusted expected outcomes and benchmarked to regional and national data, highlighting areas of strength, as well as areas for potential improvement.[8]

OBTAINING VQI DATA

VQI members have access to their own data for performance of local quality initiatives or research projects and can also obtain regional or national VQI data for research projects. To obtain national data, investigators submit requests for deidentified national data via an analytic memo to the PSO Research Advisory Council (RAC). RAC proposals undergo scientific review by members of the council to ensure no overlap with existing projects and to guide analysis of the data. Prior to submission to the national RAC, investigators are required to obtain initial review and approval from their own Regional VQI Group Research Advisory Council. Proposals to the national RAC are accepted via online submission and reviewed via a published timetable (approximately every 2 months), with notification on acceptance or revision approximately 1 month after the last due date of the cycle.[14]

VQI AND ABDOMINAL AORTIC ANEURYSM REPAIR

While general outcomes of open and EVAR repairs of abdominal aortic aneurysms have been studied in multiple large databases, the specificity of the procedural characteristics in the VQI allows for further discernment of possible drivers of outcomes over and above other data sources.

For example, examinations of EVAR and open AAA outcomes by age have been examined across a myriad of other database reviews.[15,16] However, in the VQI, the findings of greater perioperative mortality for octogenarians compared with patients aged <80 years in both open repair (20.2% vs 7.1%) and EVAR (3.8% vs 1.6%), with similar significant trends in 1-year mortality, and across emergent and elective repairs, suggest potential mechanisms. Indeed, postoperative vasopressor requirement was demonstrated to be one of the strongest factors other than octogenarian status and emergent repair associated with perioperative and 1-year mortality.[17]

Similarly, open AAA repair and EVAR have been studied in the renal dysfunction population via the American College of Surgeons National Surgical Quality Improvement Program (NSQIP) database, but intraoperative variables were restricted to data

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