Cardiovascular Thoracic Surgeon Shortage Predicted by 2020

Cardiovascular disease accounts for over 30% of deaths in the US, and will remain the leading cause of mortality and morbidity as the proportion of the elderly in the population increases. The demand for cardiovascular thoracic (CVT) surgeons is expected to increase 46% by 2025. With more than half of the practicing thoracic surgeons approaching retirement age and fewer new ones in the pipeline, a recent analysis has predicted that there will be a significant shortage of thoracic surgeons by 2020 (Grover et al., 2009).

Factors exacerbating this shortage include physician burnout leading to retirement earlier than planned, fewer coronary artery bypass graft procedures, and declining Medicare reimbursement (Physicians Foundation, 2012, Shanafelt et al., 2012, Grover et al., 2009).

A contributor to physician burnout is the financial and emotional burden of facing a malpractice claim. CVT surgeons spend an average of 20% of their 40-year careers with one or more open claims of malpractice hanging over their heads, nearly twice the average of all specialties (Seabury et al., 2013).

Overview of CVT Surgery Claims

The PIAA (formerly the Physician Insurance Association of America) is a trade organization of over 50 physician-owned professional liability companies. The graph shown below is based on a cumulative 26 years of claims data collected by the PIAA in the Data Sharing Project, the world’s largest database of medical professional liability claims.

According to PIAA data, CVT surgeons rank 9th out of 28 specialties in the number of claims closed from 1985–2011. CVT surgeons rank 11th of 28 in terms of total indemnity (damages paid to the plaintiff) with more than $431 million paid on their behalf. The average indemnity paid is 6.8% more than the average paid for all specialties ($235,820 vs. $220,731).
Individual Claims Experience in CVT Surgery

As shown in the graph below, a snapshot survey by the American Medical Association found that about 75% of CVT surgeons reported having ever been sued (Kane CK, 2007–2008 Physician Practice Information Survey). About 57% of CVT surgeons had been sued 2 or more times, and 15% reported being sued in the last 12 months.

For every 100 CVT surgeons, there were 297 claims at the time of the 2007–2008 AMA survey.
Finally, a study of National Practitioner Data Base (NPDB) data showed that the number of CVT surgeons facing a malpractice claim annually was 18.9%. This was over 2.5 times the average for all specialties and second only to neurosurgeons (Jena et al., NEJM 2011). However, the authors note that of these claims against thoracic surgeons, only about 20% resulted in an indemnity (i.e., damages paid to the patient for harm from medical treatment), as compared to 22% for all specialties.

**Causes of Medical Misadventure Claims**

What do CVT surgeons get sued for? According to the PIAA’s Data Sharing Project (1985–2011), the **top 10 medical misadventures cited in CVT surgery claims** were:

<table>
<thead>
<tr>
<th>Allegation</th>
<th>Closed Claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improper performance of a procedure</td>
<td>2,683</td>
</tr>
<tr>
<td>No medical misadventure alleged*</td>
<td>1,523</td>
</tr>
<tr>
<td>Errors in diagnosis</td>
<td>743</td>
</tr>
<tr>
<td>Failure to supervise or monitor case</td>
<td>572</td>
</tr>
<tr>
<td>Failure to recognize a complication of treatment</td>
<td>520</td>
</tr>
<tr>
<td>Surgical foreign body left in patient after procedure</td>
<td>346</td>
</tr>
<tr>
<td>Performed when not indicated or contraindicated</td>
<td>250</td>
</tr>
<tr>
<td>Delay in performance</td>
<td>208</td>
</tr>
<tr>
<td>Not performed</td>
<td>170</td>
</tr>
<tr>
<td>Medication errors</td>
<td>138</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,153</strong></td>
</tr>
</tbody>
</table>

*No medical misadventure is reported when there is an absence of an allegation of any inappropriate medical conduct on the part of the CVT surgeon.*
The most prevalent medical misadventure reported in CVT surgery claims was improper performance of a procedure, which was the primary issue cited in 35% of claims reported from 1985–2011. Improper performance of a procedure was also the most common medical misadventure cited in cases involving the death of a patient (30.1% of claims). An indemnity payment was made on behalf of CVT surgeons in 27.9% of these claims.

The top 5 most prevalent improperly performed procedures cited in CVT surgery claims (1985–2011) were:

<table>
<thead>
<tr>
<th>Improperly Performed Procedure</th>
<th>Closed Claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coronary artery bypass grafting</td>
<td>480</td>
</tr>
<tr>
<td>Operative procedures involving the blood vessels, excluding the heart</td>
<td>410</td>
</tr>
<tr>
<td>Surgical repair of complex congenital heart disease</td>
<td>153</td>
</tr>
<tr>
<td>Vascular bypass and major shunt procedures</td>
<td>152</td>
</tr>
<tr>
<td>Operative procedures of the gallbladder and biliary tract</td>
<td>146</td>
</tr>
<tr>
<td>Total</td>
<td>1,341</td>
</tr>
</tbody>
</table>

Coronary artery bypass grafting (CABG) was the most common procedure alleged to be improperly performed (14% of the 7,690 CVT surgery closed claims) between 1985 and 2011, with $29.9 million in payments made. While operative procedures involving the blood vessels, excluding the heart were the second most common procedure alleged to be improperly performed during this period (13.2% of CVT surgery), these procedures resulted in the highest total indemnity payment ($73.7 million).

Emerging CVT Risk Issue: Surgery in the Very Elderly

Among the population of those referred for cardiovascular surgery, the proportion of the very elderly, age 75 and over, has increased from 16% in 1990 to an estimated 25% today. Thoracic surgery is being performed on octogenarians and nonagenarians, and despite the increased risks that come with age, very elderly patients have been shown to benefit from cardiac surgery (Afilalo et al., Circ Cardiovasc Qual Outcomes 2012). Judicious candidate selection will become even more important as the number and ages of very elderly patients referred for surgery increase.

The decision to perform or not perform major cardiothoracic surgery should be informed by an objective assessment of the individual’s risks. Existing cardiac surgery risk scores do not perform as well in the elderly and very elderly. They emphasize co-morbidities but do not sufficiently take into account two additional factors (Afilalo et al.):
• **Frailty**, defined as a “geriatric syndrome of impaired resiliency to stressors” such as cardiac surgery, and
• **Disability**, defined as “impaired ability to carry out functional tasks”.

The Afilalo study of risk scores found the most value in the combination of these 3:

1. Co-morbidity Measure: the Parsonnet scale or the STS-PROMM scale
2. Frailty Measure: the test for 5-meter gait speed (≥6 seconds) and
3. Disability Measure: the presence of 3 or more impairments on the Nagi scale.

The Parsonnet scale is a system awarding points for such risk factors as female gender, age, hypertension, diabetes, CHF, COPD, low ejection fraction, morbid obesity, left main disease, valve disease and special conditions. The Parsonnet scale system is described in the National Adult Cardiac Surgical Database Report 2000 – 2001. The 5-meter test requires the patient to walk at a normal pace for a distance of 5 meters. It defines frailty as an average time taken of 6 seconds or more.

The Nagi list of impairments include inability to move a living room chair, bend/crouch/kneel, handle small objects with one’s fingers, lift a 10 pound object, walk up or down a flight of stairs and walk a mile. Inability to perform 3 or more of these tasks defines disability on this scale.

The 5-meter test and the list of Nagi impairments are both described by Afilalo et al. in their article “Addition of Frailty and Disability to Cardiac Surgery Risk Scores Identifies Elderly Patients at High Risk of Mortality or Major Morbidity.”
In the very elderly, it is important that the benefits of surgery may confidently be said to outweigh the risks. In making this determination, a documented systematic assessment of the risks can lend objective support to the surgeon’s decision whether or not to operate.

**Which physician would you rather be?**

An 88 year old man with a history of moderate dementia, chronic obstructive pulmonary disease, and a weight of 110 pounds underwent coronary revascularization. He never was able to be weaned from the ventilator after surgery. He later died. The surviving relatives sued the hospital, the thoracic surgeon and every other physician involved, alleging improper performance of a procedure, wrongful death, and stated that the patient should never have had the surgery in the first place. Three years later when the case came to trial, the plaintiff attorney questioned the thoracic surgeon. Let’s examine several possible responses, all of them paraphrased from actual cases.

**Attorney:** “Doctor, what factors did you take into consideration when you determined that Mr. Jones was a good candidate for this surgery?”

- **Dr. A:** “The surgical clearance is done by the referring physician. I assumed he had made the determination that the patient was a good candidate.”
- **Dr. B:** “It was my opinion at the time that the patient was a good candidate from a cardiovascular standpoint. If there was a respiratory problem, it would be the responsibility of the anesthesiologist to assess.”
- **Dr. C:** “A potter makes pots, and a surgeon does surgery. I’m a surgeon.”

Now imagine if the physician was able to testify as follows.

- **Dr. D:** “I always assess my heart surgery patients using a scale for comorbidities, frailty and disabilities. This gentleman was at greater than average risk for the surgery, but I informed the patient and family of this, and they wished to proceed despite the risk.”

**Risk Issue: Heightened Scrutiny for Unnecessary Cardiovascular Procedures**

The development of coronary revascularization in the early 1970s and the subsequent rise in the numbers of these surgeries performed was followed by sharp questions about regional variation and the lack of evidence of any benefit of these surgeries over medi-
Nevertheless, thoracic surgeons in the US have good data on the quality, quantity and transparency of coronary revascularizations:

- Mortality rates declined from 6.5% in 1988 to 2.1% in 2005 (ACCF/AHA Guideline 2011).
- The Society for Thoracic Surgery (STS) pioneered in surgical quality improvement with the collection and public reporting of clinical outcomes data in online hospital CABG report cards (Ferris TG, NEJM, 2010).
- A New York study (Hannan et al., J Am Cardiol. 2012) and others found that CABG has a far better track record on medical necessity than percutaneous coronary interventions (PCIs).

In the 2012 New York study, it was determined that in PCIs, the indications for the procedure were found to be appropriate only 36% of the time; nearly 50% of the time the indications were uncertain; and 14% of the time indications were inappropriate. By contrast, in coronary artery bypass graft cases (CABGs), the indications for the surgery were found to be appropriate 90% of the time, 8.6% were uncertain and only 1.1% were deemed inappropriate.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Appropriate indications for surgery</th>
<th>Uncertain indications</th>
<th>Inappropriate indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCI</td>
<td>36%</td>
<td>50%</td>
<td>14%</td>
</tr>
<tr>
<td>CABG</td>
<td>90%</td>
<td>8.6%</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

Similar findings on the relative medical necessity of PCIs performed versus CABGs performed were reported in a comparative study of patients in New York versus Ontario (Ko et al., JAMA, 2013) and a study comparing utilization between Medicare fee-for-service patients versus capitated Medicare Advantage patients (Matlock et al., JAMA, 2013).

Cardiac procedures by cardiologists and cardiac surgeries by thoracic surgeons are both under scrutiny. Cardiologists, cardiovascular thoracic surgeons and the institutions where they practice are currently being targeted for malpractice claims, investigations, revenue claw-backs and even prosecutions for unnecessary procedures.

In 2002, a lawsuit was filed on behalf of 82 patients (including 9 who had died) against Redding Medical Center in California, alleging that they received unnecessary cardiac bypass surgeries attributed to the facility’s drive for revenue (Charatan, 2003).
Case Study: Unnecessary Aortic Valve Replacement

A 65-year-old man underwent trans-esophageal echocardiogram (TEE) and cardiac catheterization. He had no chest pain or dyspnea, chest discomfort suggestive of ischemia, edema, paroxysmal nocturnal dyspnea, orthopnea, palpitations, near-syncope, syncope, or claudication. Nevertheless, the cardiologist referred the patient to a CVT surgeon.

The CVT surgeon recommended that the patient undergo aortic valve replacement, despite the lack of clinical findings. The patient underwent the procedure a month later. Following the procedure, the patient developed a severe surgical site infection, resulting in his death.

His surviving wife filed a lawsuit against the thoracic surgeon, cardiologist, and hospital, alleging that her husband’s death was the result of an unnecessary cardiac procedure. The claim stated that the surgeon recommended that the patient undergo aortic valve replacement without sufficient medical indication, thus negligently subjecting the patient to the risks of surgical complications, including infections and death (Evans vs. Cardiovascular Surgery Associates, Davidson County, Tennessee Circuit Court, 2012).

The Role of Practice Guidelines

Payers, investigators, plaintiff attorneys and prosecutors disputing the medical necessity of a procedure are increasingly turning to professional guidelines to support their determinations. How can thoracic surgeons best protect themselves and their patients from such after-the-fact determinations?

Particularly in this environment, thoracic surgeons are well advised to be familiar with professional guidelines for the procedures they perform, document the individual patient’s indications in the record, and document their rationale when departing significantly from established practice guidelines.


This guideline also appears in a searchable database of all published medical guidelines at “Guidelines.gov”, the website maintained by the Agency for Healthcare Research and Quality (AHRQ).
Strength of Evidence. Here is an example of the first indication/recommendation provided in the ACCF/AHA Task Force guideline:

<table>
<thead>
<tr>
<th>Left Main CAD Revascularization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
</tr>
<tr>
<td>1. CABG to improve survival is recommended for patients with significant (&gt;50% diameter stenosis) left main coronary artery stenosis. (Level of Evidence: B)</td>
</tr>
</tbody>
</table>

The recommendations are rated on a scale crafted by the Task Force. The Class of Recommendation (I-IIa-IIb-III) refers to the size of the treatment effect that may be expected based on the evidence. Patients with greater than 50% diameter stenosis of the left main coronary artery SHOULD have revascularization due to the expected benefit of the treatment (Class I). A Class IIa recommendation is one that may reasonably be performed; Class IIb is one that may be considered; and Class III is considered of no benefit or is harmful to the patient.

Level of Evidence A-B-C refers to the estimated certainty of treatment effect. Level A means the recommendation is based on multiple randomized control studies (RCTs) or meta-analysis and on multiple populations evaluated. Level B means the recommendation is based on either a single randomized control study or multiple nonrandomized studies. Level C is based not on studies but on consensus of expert opinion, case studies or standard practice.

Thus in the example above (coronary revascularization for patients with more than 50% stenosis of the left main), it is a recommendation that SHOULD be performed (Class I) and the evidence for it is based on one or more studies, rather than opinion, case studies or standard practice (Level of Evidence: B).

Physicians are encouraged to consult the full guideline for more detail. For example, the authors note that some recommendations do not lend themselves to clinical trials, and therefore a lower level of evidence does not necessarily mean the procedure shouldn’t be done.

Guidelines for STEMI, Stable Ischemic Disease and Transcatheter AVR. The following is a list of additional guidelines and web links that may be helpful for CVT surgeons.

- Guideline for the Diagnosis and Management of Patients With Stable Ischemic Heart Disease. ACCF/AHA/ACP/AATS/PCNA/SCAI/STS, 2012.
Does a Professional Guideline Constitute the Standard of Care?

No, it does not. The standard of care is a legal term, determined in an individual case in a court of law. Professional guidelines are determined by medical professional organizations. They are not a mandate to be applied to all patients, but rather they are a factor to be taken into consideration in an individual case. As we have seen, guidelines come with varying levels of expected effect and strength of evidence.

The AMA describes practice guidelines as important starting points for clinical-decision making, but says they “do not, and should expressly state that they do not, establish standard of care or create specific requirements for physicians that restrict the exercise of their clinical judgment” (AMA Health Care Standard H-450.935).

As the authors of the 2011 guideline on coronary revascularization note:

“The ultimate judgment regarding the care of a particular patient must be made by the health-care provider and patient in light of all the circumstances presented by that patient. As a result, situations may arise for which deviations from these guidelines may be appropriate.”

Risk Management Recommendations on Risk, Guidelines and Consent

Adverse events and medical malpractice claims go hand in hand (Greenberg et al., RAND study, 2010).

Thoracic surgery claims often involve a perfect storm of factors: a patient with multiple risk factors, a less-than-robust consent procedure, and ill-defined indications for the procedure. Risk management recommendations for reducing risk include:

1. Be familiar with the indications in current professional guidelines for CVT surgeries that you perform.
2. Understand the scope, limitations, and relative strength of evidence for CVT surgery guidelines. Guidelines are an aid to decision-making, not a substitute for it. Guidelines are a factor to inform your decision making.
3. Further inform your decision-making with an objective assessment of the individual patient’s risk factors, particularly in higher risk patients such as the very elderly. Consider the use of the co-morbidity + frailty + disability scales described above.
5. When departing significantly from an established professional guideline in an individual patient’s case, provide documentation in the record of your rationale for doing so.
6. The patient’s signature on the consent may not be enough to show a
shared decision making process took place—document the substance of the consent discussion between you and the patient, concerns the patient raised, and how these were answered.

7. Take into account your individual patient’s concerns, questions, values and risk tolerance. Have a substantive discussion with the patient to elicit those concerns. Personally confirm that you have an informed patient who has decided that the benefits of the planned surgery outweigh the risks. Make informed consent a shared decision making process.

Bibliography

Web links are provided as a convenience and are subject to change. If the link does not work, web-search the document by title at the time of use.

11. Five meter test and Magi impairment list may be found at http://circoutcomes.ahajournals.org/content/5/2/222.full.pdf