Future of vascular surgery is in the office

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Objective: The practice of vascular surgery is under pressure from various specialties and payers. Our group started office-based procedures in May 2007. This article reports our study of the effect of this change on our case volume, office revenue, and the financial impact on the health care system.

Methods: Between May 1, 2006, and April 30, 2007 (period 1), and between June 1, 2007, and May 31 2008 (period 2), 3041 and 3351 cases, respectively, were performed. In period 1, only venous cases could be done in the office. Before arteriogram, serum levels of urea nitrogen and creatinine were obtained. The number of percutaneous cases done in the hospital and office setting was analyzed, and revenue was calculated based on the 2008 Medicare fee schedule for our region. Amputation and mortality rates at 30 days were documented. Hospital DRG payment schedule was obtained.

Results: In period 1, 670 (22% of total) percutaneous procedures were performed compared with 1502 (44.8%) in period 2, a twofold increase. In period 1, 1.5% of total cases were done in the office compared with 31% in period 2. There was a fivefold increase in revenue from these procedures. No deaths or amputations occurred as a result of procedures performed in the office. No anesthesiologist’s expense and minimal preprocedural expenses were incurred. Total payment by Medicare, DRG payment to the hospital, and the physician component were higher in all the cases.

Conclusions: A vascular surgery practice can benefit from office-based procedures. Procedures can be done safely. It results in an increase in the number of percutaneous procedures and revenue with a significant savings to the health care system. Surgeons can control their schedule. Every vascular surgeon should consider doing these procedures in office. (J Vasc Surg 2010;51:509-14.)

Numerous challenges confront vascular surgeons with respect to the practice of their specialty. First, there has been a constant decline in reimbursement for vascular procedures; for instance, the Deficit Reduction Act of 2005 reduced vascular laboratory reimbursement between 18% and 51%, with a negative effect of at least 5% in vascular practice total revenue. As Medicare has decreased reimbursement, private insurance companies have followed suit. Another challenge is competition from other specialties, including interventional radiology, interventional cardiology, and interventional nephrology, all of which may also treat patients with vascular disease.

Further, time management continues to be an issue. Operating room scheduling can be extremely difficult for cases that fall outside of scheduled block times or arrive as emergencies. A universal complaint is time lost between cases as an operating room is “turned over.” Patients who require dialysis often face a significant wait to treat a failing access. This may lead to an unacceptable number of temporary catheters being placed in these patients.

Indeed, vascular surgeons are treating an increasing number of patients by percutaneous techniques and need time slots to perform these procedures in appropriate settings. Hybrid operating rooms with fluoroscopy are expensive and scarce. Some vascular surgeons may be able to do their procedures in other hospital settings, such as the interventional radiology suite or the cardiac catheterization laboratory. Unfortunately, these alternative venues are often under the control of the radiologists or cardiologists, who relegate the vascular surgeon to nonprime time hours. Wherever the procedure is performed, care in the hospital setting is expensive.

The Center for Medicare and Medicaid Services (CMS), which manages Medicare, started reimbursing physicians for certain percutaneous vascular procedures in the office setting, including percutaneous dialysis access, arterial imaging and intervention, venous imaging and intervention, and catheter procedures. Because of these challenges, we decided to open an office-based imaging, access, and venous center. The center opened in May 2007. In this study, we compare our case volume and revenue stream for the 12-month period before and right after the center was opened.

METHODS

Total cases done by our group of four vascular surgeons were identified and records were reviewed for endovascular...
cases for two time periods. Period 1 was the interval between May 1, 2006, and April 30, 2007, before we opened the access and imaging center. Period 2 was the interval between June 1, 2007, and May 31, 2008, after opening the center. Patients who weigh >400 pounds, those who are at high cardiac risk, or those who have no pain tolerance are not operated on in the office. Before intervention, all patients receive an oral antibiotic and an analgesic tranquilizer. After the procedure, three doses of oral antibiotic are administered. Patients who come for catheter removal do not receive any oral medication.

In period 1, we did not remove any catheters in the office. In angiogram patients, preoperative prothrombin time (PT), partial thromboplastin time (PTT), and levels of serum urea nitrogen and creatinine were measured. Use of a closure device after the angiogram was according to the surgeon’s preference. Procedures were done under local anesthesia, without an anesthesiologist. A standard hydration protocol was used for angiogram patients who also might have had conscious sedation.

Patients were monitored by registered nurses certified in advance cardiac life support (ACLS) before, during, and after the procedure. All surgeons were also ACLS-certified. Midazolam (Hospira Inc, Lake forest, Ill) was used for intravenous sedation. Appropriate drugs are stocked for resuscitation, including Flumazenil (Abraxis, Schaumburg, Ill). We instituted the same protocol for monitoring as used in the hospital. Patients recover in our recovery room under the supervision of registered nurses and are discharged when discharge criteria are met. Appropriate resuscitative equipment is kept in the vicinity. All the vascular surgeons have privileges to provide conscious sedation in the hospital. Our hospital is one block from the office. There are strict written protocols for each procedure. One of us serves as the medical director of the facility. For patients undergoing venous or dialysis-related procedures, no preoperative laboratory tests are obtained.

The 30-day rates for amputation and mortality were documented based on medical record review. The procedures done in the hospital and office setting were analyzed, and the 2008 Medicare fee scale for our region was used to calculate revenue. We had been performing these procedures in the endovascular suite in the operating room. The hospital provided us with the reimbursement it would have received from Medicare for the codes we provided to the hospital. Our hospital provided us with the reimbursement it would have received from Medicare for the codes we provided to the hospital.

An attempt was made to contact every patient by telephone on the next working day. The patients were asked about their well being, if they had any questions, and if they would come to the office in the future if they needed another procedure.

RESULTS

During periods 1 and 2, 3,041 and 3,351 cases were performed respectively. The overall number of cases increased by 10% from period 1 to period 2. These cases consisted of both open and percutaneous vascular surgery procedures. This sample does not include patients who had sclerotherapy or phototherapy for varicose veins. Open procedures were excluded from further analysis. In period 1, only venous ablation cases could be done in the office setting. In period 2, we performed venous procedures, dialysis access and catheter-related procedures, peripheral arteriograms, angioplasty, and stent placements (Table I). In period 1, 670 procedures (22% of total) were performed percutaneously compared with 1502 (44.8%) in period 2, a twofold increase. In period 1, 1.5% of the total cases were done in the office, with 30.3% in period 2. During period 1, 626 cases (20.6%) were done percutaneously in the hospital compared with 486 (14.5%) in period 2 (Table II).

There was a fivefold increase in revenue attributable to procedures performed in the office setting, which contributed to higher overall revenue for the practice. If these procedures had been performed in the hospital, we would have collected $368,897.00 compared with $1,688,686.00 received because of the office setting. There was a savings of $824,059.00 to Medicare because these procedures were done in the office (Table III). This would be true if all the patients had Medicare as their primary insurance. We are using this as a benchmark. In reality, the patients we treated had different types of insurance, but most were Medicare patients.

As a percentage of total revenue, 82% of patients were contacted after the procedure, and 98% were satisfied with the overall experience and would come back to the office for further procedures if needed. No limb loss or deaths occurred in the 30-day postprocedural period. No patient

### Table I. Procedures that can be performed in office setting

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Period 1 No. (%)</th>
<th>Period 2 No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aortogram</td>
<td>3041</td>
<td>3351</td>
</tr>
<tr>
<td>Aortogram with angioplasty</td>
<td>670 (22)</td>
<td>1502 (44.8)</td>
</tr>
<tr>
<td>Aortogram with runoff</td>
<td>44 (1.5)</td>
<td>1016 (31)</td>
</tr>
<tr>
<td>Aortogram with stenting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catheter insertion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catheter removal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endovenous laser treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fistulogram</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fistulogram with angioplasty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fistulogram with coiling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fistulogram with stent placement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fistulogram with thrombectomy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microphlebectomy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sclerotherapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spider vein laser therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venogram</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table II. Breakdown of percutaneous cases done in the hospital and office

<table>
<thead>
<tr>
<th>Procedures</th>
<th>Period 1 No. (%)</th>
<th>Period 2 No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>3041</td>
<td>3351</td>
</tr>
<tr>
<td>Percutaneous</td>
<td>670 (22)</td>
<td>1502 (44.8)</td>
</tr>
<tr>
<td>Percutaneous in the office</td>
<td>44 (1.5)</td>
<td>1016 (31)</td>
</tr>
<tr>
<td>Percutaneous in the hospital</td>
<td>626 (20.5)</td>
<td>486 (14.5)</td>
</tr>
</tbody>
</table>
Table III. Economic effect of office-based procedures

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Office, No.</th>
<th>Office</th>
<th>Hospital</th>
<th>DRG Office</th>
<th>Procedure</th>
<th>Hospital</th>
<th>Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catheter insertion</td>
<td>146</td>
<td>$947</td>
<td>$309</td>
<td>$1581</td>
<td>$138,262</td>
<td>$45,114</td>
<td>$230,826</td>
</tr>
<tr>
<td>Fistulogram</td>
<td>47</td>
<td>$633</td>
<td>$183</td>
<td>$2655</td>
<td>$252,216</td>
<td>$48,138</td>
<td>$300,015</td>
</tr>
<tr>
<td>With thrombectomy</td>
<td>113</td>
<td>$2232</td>
<td>$426</td>
<td>$2977</td>
<td>$83,100</td>
<td>$109,480</td>
<td>$283,580</td>
</tr>
<tr>
<td>With angioplasty</td>
<td>238</td>
<td>$2450</td>
<td>$460</td>
<td>$5808</td>
<td>$44,100</td>
<td>$5445</td>
<td>$52,272</td>
</tr>
<tr>
<td>With stent placement</td>
<td>9</td>
<td>$4900</td>
<td>$605</td>
<td>$5741</td>
<td>$52,954</td>
<td>$25,740</td>
<td>$78,704</td>
</tr>
<tr>
<td>With coiling</td>
<td>22</td>
<td>$2407</td>
<td>$1170</td>
<td>$5808</td>
<td>$44,100</td>
<td>$5445</td>
<td>$52,272</td>
</tr>
<tr>
<td>Aortogram</td>
<td>12</td>
<td>$1003</td>
<td>$204</td>
<td>$1895</td>
<td>$12,036</td>
<td>$24,448</td>
<td>$36,484</td>
</tr>
<tr>
<td>With Angioplasty</td>
<td>33</td>
<td>$3854</td>
<td>$589</td>
<td>$2977</td>
<td>$127,182</td>
<td>$19,437</td>
<td>$98,241</td>
</tr>
<tr>
<td>With runoff</td>
<td>104</td>
<td>$1397</td>
<td>$267</td>
<td>$1895</td>
<td>$148,288</td>
<td>$27,768</td>
<td>$175,056</td>
</tr>
<tr>
<td>With stenting</td>
<td>11</td>
<td>$5860</td>
<td>$719</td>
<td>$5808</td>
<td>$64,460</td>
<td>$7909</td>
<td>$71,797</td>
</tr>
<tr>
<td>Endovenous laser treatment</td>
<td>132</td>
<td>$1539</td>
<td>$324</td>
<td>$1695</td>
<td>$203,148</td>
<td>$42,768</td>
<td>$245,916</td>
</tr>
<tr>
<td>Microphlebectomy</td>
<td>19</td>
<td>$423</td>
<td>$423</td>
<td>$1695</td>
<td>$8037</td>
<td>$8037</td>
<td>$32,205</td>
</tr>
<tr>
<td>Venogram</td>
<td>8</td>
<td>$1079</td>
<td>$208</td>
<td>$1895</td>
<td>$8632</td>
<td>$1664</td>
<td>$15,160</td>
</tr>
<tr>
<td>Total</td>
<td>1016</td>
<td>$28,884</td>
<td>$6021</td>
<td>$37,596</td>
<td>$1,688,686</td>
<td>$368,897</td>
<td>$2,512,745</td>
</tr>
</tbody>
</table>

R/C, Reimbursable charges.
*aCombination of hospital reimbursement and professional component.
*bReimbursement for office procedures.

was transferred to the hospital as an emergency from the office. One patient was admitted and operated on for bleeding from the femoral artery 6 hours after discharge. A second patient presented with a ruptured bypass after angioplasty that was successfully repaired 1 day after the procedure. A third patient required a femoropopliteal bypass owing to an acute occlusion of superficial femoral artery that occurred 2 days after the procedure. Serum levels of urea nitrogen and creatinine were not checked in the postprocedural period, but no patients required dialysis, a postperipheral angiogram, or intervention.

DISCUSSION

In addition to being safe and efficient, office-based vascular surgery is cost-effective. The overall cost for performing these procedures is lower when they are done in the office setting compared with the hospital. This is partly due to the streamlined approach that can be taken in medically stable outpatients. There was no anesthesiologist’s expense, and minimal preprocedural expense was incurred. Although practice reimbursement per case showed a significant increase, practice overhead also rose sharply. As a percentage of total revenue, the overhead remained the same between period 1 and period 2. It is important that a sound business plan be designed, with a thorough assessment of the expenses involved in setting up an imaging center. The costs would vary from region to region, individual practice location, and practice pattern.

A comparison between period 1 and period 2 attests to a significant increase in the number of cases done percutaneously. This reflects not only a growing practice but also a shift towards endovascular procedures compared with open procedures, which has been recognized worldwide. This further supports the importance of office-based intervention.

The patients stay for an average of 2.8 hours at the center. Discharge for patients after venous procedures and dialysis-related procedures is usually <15 minutes. We have two rooms but not enough staff to run both rooms on a consistent basis, although we have run two rooms from time to time. Turnover time depends on our staffing.

Because this is an office-based center, we can use the time between cases for other office activities. We have handled as many as 10 cases between 8:30 AM and 5:00 PM. We perform angiograms in the morning to maximize time for recovery. One of us is available to perform cases every day of the week. The dialysis catheters are taken out by our nurse practitioner when we are present in the office.

We have not lost procedures due to equipment failure. In the event of a malfunction, we have a contract for repair ≤24 hours. We are able to reschedule cases in the office should equipment failure occur; but in reality, equipment failure is rare.

The physician who evaluates the patient usually does the procedure. If another surgeon is going to do the procedure, we discuss it in advance, thereby minimizing surprises.

Vascular surgery is one of the younger specialties. We need to establish ourselves as experts in all phases of vascular disease—arterial, venous, and dialysis access. This would be hard, if not impossible, to duplicate by any other specialty. We believe that safe, efficient, and cost-effective delivery of care will separate us from other specialties. During the last few years, various centers that manage conditions related to dialysis access have opened,2 and there are many venous centers that address venous conditions and perform percutaneous ablation of the saphenous veins. Few centers perform all three modalities, that is, dialysis-access-related procedures, venous procedures, and peripheral arterial procedures. If a surgeon has access to an
patients, because a malfunctioning access can be assessed
by the surgeon or patient. This is especially valuable for dialysis
patients, because a malfunctioning access can be assessed
by the surgeon or patient. This is especially valuable for dialysis
and treated on short notice, which helps the patient avoid
treatment delay and reduces temporary catheter usage.

Many different specialties are managing vascular dis-
ease. For example, most dialysis access centers are run by
interventional nephrologists. These centers receive support
from the dialysis companies, which enables interventional
nephrologists to open these centers with little or no finan-
cial risk. A few centers are operated by interventional radi-
ologists, but many of these centers are not necessarily
independent and work closely with the vascular surgeons.
Cardiologists have their own patient base and are perform-
ing peripheral interventions in increasing numbers.

Planning. Initially, there has to be a commitment by
the vascular surgeons to open an office-based center. Once
we decided to open the center, we recruited a business
manager (coauthor) who had extensive experience in build-

ing and running multiple dialysis centers. We visited an-
other center doing similar procedures. We did not hire a
cosultant; instead, we did our own research. The cost of
the center will depend to a great degree on the availability
of a building. We formed a leasing company to buy all the
equipment and build the center in conjunction with our
existing office.

A business plan needs to be developed for the individ-
ual practice. The basic requirement is an endovascular suite
with a recovery area somewhere in the range of 3000 square
feet. In an ideal situation, the present office location could
be expanded. If this is possible, other personnel in the office
can be used to supplement the services being provided
through the access and imaging center. If a separate build-
ing is needed, it may result in slight increase in cost and
additional personnel.

A capital investment is required for buying or leasing a
C arm, power injector, radiolucent table, radiofrequency
ablation machine, or laser ablation machine for venous
procedures, ultrasound machine, and monitoring equip-
ment. Most vascular surgeons’ offices already have access to
a vascular laboratory, but this can be expanded to meet the
needs of the access and imaging center. The center needs to
be adequately supplied with various angiographic equip-
ment, including catheters, stents, sheaths, and guidewires.

Adequate staffing is critical, including registered nurses
who are ACLS certified. Also required are strict protocols
for quality control and for conscious sedation, sterilization,
and radiation safety, among others. The staff will need
training in aseptic techniques. The staff will also have to
develop adequate postprocedural follow-up to make sure
any complication is timely recognized and treated. Like-
wise, it is critical to have billing personnel who are well
versed with coding guidelines. However, there may be state
regulatory state requirements that need to be addressed.
No certificate of need is required for doing these proce-
dures in the office.

Benefits. We see several benefits in owning our own
access and imaging center. For the dialysis procedures, we
can do the right procedure at the right time. We can
determine if the patient is best suited for an open procedure
in the operating room or a percutaneous procedure in the

Table IV. Comparison of cases that can be performed
in an ambulatory surgery center (ASC) and in the office

<table>
<thead>
<tr>
<th>Procedure</th>
<th>CPT code</th>
<th>ASC</th>
<th>Office</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venogram</td>
<td>36005</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Foreign body retrieval</td>
<td>37203</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Angiograms</td>
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</tr>
<tr>
<td>Aortogram</td>
<td>36200</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Extremity</td>
<td>36140</td>
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<td>Yes</td>
</tr>
<tr>
<td>Cavagram</td>
<td>36010</td>
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<td>Yes</td>
</tr>
<tr>
<td>Carotid</td>
<td>36215</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Visceral</td>
<td>36245</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Embolization</td>
<td>37204</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Uterine artery embolization</td>
<td>37210</td>
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<tr>
<td>Thrombectomy</td>
<td>37184</td>
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<td>Yes</td>
</tr>
<tr>
<td>Mechanical</td>
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<td></td>
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</tr>
<tr>
<td>Thrombolysis</td>
<td>37201</td>
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<td>Yes</td>
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<tr>
<td>Infusion</td>
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<tr>
<td>Angioplasty</td>
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<td>PTA tibioperoneal trunk</td>
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<td>Venous</td>
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<tr>
<td>Stent</td>
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<tr>
<td>Intravascular stent</td>
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</tr>
<tr>
<td>Peripherally inserted catheter</td>
<td>36569</td>
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<td>Yes</td>
</tr>
<tr>
<td>Dialysis</td>
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<tr>
<td>Fistulogram</td>
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<td>No</td>
<td>Yes</td>
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<tr>
<td>Declot</td>
<td>36870</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Venous angioplasty</td>
<td>35476</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Declot, any method</td>
<td>36558</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>


Table IV. Comparison of cases that can be performed
in an ambulatory surgery center (ASC) and in the office

Challenges. Vascular practices face many challenges,
including:

1. poor reimbursement for the professional component;
2. poor time management because of working within a
   rigid hospital operating room system;
3. poor patient care, because of delay in providing care,
   especially in patients on dialysis;
4. poor or no access to radiology suites and cardiac cathe-
   terization labs; and
5. changing referral patterns because many patients go
directly to interventional nephrologists, cardiologists,
or radiologists rather than being evaluated by vascular
surgeons prior to any intervention.

There continues to be a decline in insurance company
payments that do not keep up with inflation. The cost of
running a practice continues to increase because medical
inflation is almost always greater than general inflation.

Time management issues continue to trouble surgeons
in the hospital. With office-based procedures, we are in
complete control of the schedule. With training and expe-
rience, turnover times can be pared. There is no competi-
tion for operating room time with other groups. Even more
importantly, a late add-on case is done with no delay for the
surgeon or patient. This is especially valuable for dialysis
patients, because a malfunctioning access can be assessed
and treated on short notice, which helps the patient avoid
treatment delay and reduces temporary catheter usage.

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No certificate of need is required for doing these proce-
dures in the office.

Benefits. We see several benefits in owning our own
access and imaging center. For the dialysis procedures, we
can do the right procedure at the right time. We can
determine if the patient is best suited for an open procedure
in the operating room or a percutaneous procedure in the
office. A patient who needs a percutaneous procedure does not have to wait for an intervention because the procedure can be done soon after the detection of pathology. We can salvage most of the accesses before they thrombose by a very active screening program for failing fistulas and arteriovenous grafts.\(^3,4\) We are able to control our schedule. Many more procedures can be done during working hours when the office is open, in contrast to a similar period of time in the hospital operating room.

Procedures that can be done in the office are listed in Table I. Case volume will grow as technology and skills improve, as well as from referring physicians who realize how effectively we can provide the care in the office. In addition, by word of mouth, we are receiving more direct referrals because of patient satisfaction. Postoperative patient calls have shown 98% patient satisfaction.

**Safety.** Most data available for outpatient endovascular interventions have to do with procedures being done in the hospital and the patient being discharged the same day. Criado et al\(^5\) and Lombardi et al\(^6\) confirmed the safety of these procedures being done in the hospital with the same-day discharge. Lombardi et al also showed significant cost-savings when the procedure was done on an outpatient basis. Now, many procedures are being done in office-based settings.

Patient safety is paramount in any setting and especially in the office setting. In 2008 we presented data at the Midwestern Vascular Surgical Society meeting reporting a complication rate of 2.1% and 0% mortality in 932 procedures. We have now been open for 2 years and there has been no death, dye-related renal failure needing dialysis, or limb loss due to a complication. The change in the setting from the hospital to the office should not change the complication rate inherent in the procedure. Protocols are needed to take care of these complications if they occur in the office.

**Increased revenue and decrease in health expenses.** Revenue to the practice significantly increases when the procedures are done in the office. Total revenue will depend on the mix of cases. We were able to increase the procedures done in the office. A patient who needs a percutaneous procedure does not have to wait for an intervention because the procedure can be done soon after the detection of pathology. We can salvage most of the accesses before they thrombose by a very active screening program for failing fistulas and arteriovenous grafts.\(^3,4\) We are able to control our schedule. Many more procedures can be done during working hours when the office is open, in contrast to a similar period of time in the hospital operating room.

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Increased revenue and decrease in health expenses. Revenue to the practice significantly increases when the procedures are done in the office. Total revenue will depend on the mix of cases. We were able to increase the revenue stream without compromising patient safety. Overhead increases, but the net result is an increase in physician and employee compensation. At the same time, there is a significant savings to Medicare and other payers.

There is minimal preoperative workup. The only laboratory tests done before the angiogram are measurements of serum levels of urea nitrogen and creatinine, PT, and PTT. We do not do any preprocedural workup in patients who are having dialysis-related or venous procedures. Dialysis patients are quite comfortable at their current potassium levels and are able to manage swings in potassium levels very well.

We do all dialysis-related and venous procedures under local anesthesia. Light or moderate conscious sedation is used for peripheral angiography and interventions. There are no costs for an anesthesiologist or for any of the other ancillary services that are provided in the hospital. We have shown that when the procedure is done in the hospital, Medicare pays more for each procedure when payment to the hospital and the professional component are combined (Table III) compared with the total payment for the office-based procedure. This ultimately results in savings to the payers.

**CONCLUSIONS**

Our office-based access and imaging center has improved our revenue stream, improved quality of care, and improved our time management. We strongly recommend that every vascular surgery practice carefully considers its options and opens an office-based center. Individual surgeons who do not have the resources could partner with others. In summary, an office-based access and imaging center increases revenue for the doctors and their team, decreases health care expenses, and most importantly, improves patient care.

**REFERENCES**


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and your case mix before you go to this kind of an endeavor. The one easiest thing to calculate may be our overhead. Our overhead was 60% before we opened this center, and the overhead even after doing this is still 60%. But since our overall revenue has increased significantly, we are able to take more pay home. So it looks daunting, but it is not that difficult. But you need to have a proper business plan depending on your case mix.

Dr Linda Harris (Buffalo, NY). What is the cost of maintaining all the equipment that you need in your office, including wires, catheters, and balloons?

With the proposition now that there is going to be bundling of endovascular procedures, have you calculated that into your evaluation of how much financial benefit there is to the practice?

Dr Jain. We are not totally sure of that. And the reason for that is because we have friends in interventional radiology who actually have a much stronger lobbying group than we do and they are always fighting for it.

But coming back to the cost of catheters, et cetera, everything that we have in the office is on consignment. So we don’t pay for it until we use it. And you can easily negotiate—you have to be able to negotiate. There are several companies who would like to continue coming to your office.

What is crucial to this is data collection, and that is why we are presenting this here. My hope is that all the centers like us are able to collect data. If we are doing 1000 to 1500 cases in our office, if there are 10 centers like that, if we can every year give to Medicare 15,000 to 20,000 cases, how much money we are saving to Medicare, we may have a better case.

Dr George Meier (Cincinnati, Ohio). Krishna, thanks very much for bringing this to us. I think it is important that we get that on the table and that people start discussing the issues, since it is relatively new to many vascular surgeons, yet for many interventional nephrologists this is old hat. I think that one of the challenges that we are going to have is how we prove the quality of what we are doing. I would like your insight into that, because clearly quality is going to be an important component of these interventions over time. How are we going to maintain quality with multiple centers performing these procedures across multiple specialties? Thanks for bringing this to us.

Dr Jain. That is absolutely right. That is one of our concerns and that is the reason we are collecting data and publishing it. What I would suggest is—because the biggest number of cases, at least the dialysis, are being done by interventional nephrologists with very little oversight, and now there is this society, another society like the Society of Clinical Vascular Surgery—to get together and have a position paper and have some guidelines, what are the requirements. We have created an operating room environment basically in our office, and everyone one of us, including our nurses, are all ACLS [advance cardiac life support] certified. So we are very quality conscious, but right now there is really no way to measure how we can make sure that it is being done. And if we don’t do it, the government will make us do it. So I think we should work together to make sure that we have the data and publish that data for quality control.

Dr Peter Lawrence (Los Angeles, Calif). We have built a similar center at UCLA [University of California, Los Angeles] and have run into one problem, and I’d be interested in your advice. We are represented by a university that negotiates the contracts. We do well with Medicare, but when we get into contracts with other health plans, some of them have only been paying us the pro fee rather than the global for ambulatory cases. We may use $1000 worth of devices or catheters and can’t get that reimbursed. I am curious as to whether you have run into this with contracts with other health plans, how you force them to pay the global rate in the office rather than paying the pro fee alone, which ends up with a net loss if you can’t get the global revenue.

Dr Jain. You are absolutely right, and that is sometimes a problem. We have not faced that problem. Kalamazoo is a smaller town and we have a relationship with the insurance companies.

But the data like what we are presenting, if we take it to them, that if we do it in the office you are going to save $3000, it would be easier to convince them that this is the right thing to do. It may take some time, and I would urge a center like yours and others to get together and pool your data and show how you can save them the money. And everybody is looking. The government wants to cut $2 trillion, and we can show them in a very minute scale how we can save some money.

Dr Robert Zwolak (Lebanon, NH). This is an important paper that leads me to make one point and ask one question. The observation is that we need to be careful about reimbursement recommendations because in 2011 there is likely to be a new coding scheme for percutaneous intervention with new reimbursements. SVS [Society for Vascular Surgery] is working with cardiologists and the radiologists to make the new system as reasonable as possible.

My question has to do with training. It is a reality that many vascular practices are shifting substantially to office-based procedures. You demonstrated a net reduction in expense to the government for providing these procedures, and I suspect that will fuel a continued migration from hospital to office. In your practice, do you or your partners operate exclusively in the hospital or the office? What do you see happening to surgeons as we go forward? Will there be two types of vascular surgeon, the office-based surgeon and the hospital-based surgeon? Should we consider separate office-based vs hospital-based training paradigms?

Dr Jain. I don’t think so. Because what we are doing in the office basically is the same thing we are doing in the hospital. It is the same skill set that we use in the hospital, in the endovascular suite, or radiology practice. It is the one we are bringing to the office because people like me, who are older, are learning from my younger partners. So what they are doing in the hospital, similar procedures we are doing in the office. We have not reached a point where the radiology is doing only the venous practice. Some practices do that, but the way we are set up, all guys do all the things. So some of that may occur, but I think it will take time.