Kaiser Permanente Southern California Hemodialysis Access Program: Lessons Learned

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Introduction

- In 1996, SCPMG prepared for the Medicare ESRD Managed Care Demonstration Project
  - Instituted Continuous Quality Improvement (CQI) process
- NKF-DOQI, 1997
- Multidisciplinary Team
  - Nephrology, Vascular Surgery, Interventional Radiology, Care Managers, Nursing, Administration
National Kidney Foundation: DOQI

- Dialysis Outcomes Quality Initiative
  - 1997
  - Encouraged increased placement of fistulas

- FFBI: Fistula First Breakthrough Initiative
  - >50% incidence AVF
  - >40% prevalence AVF
  - Patient education, vessel protection, vessel mapping, maturation lead-time
Critical Elements for Success

- Team Building
- Education
- Data collection and feedback
Team Building

- KP culture is to work collaboratively in teams
- Physicians schedules have ½ day per week of paid educational/administrative time
- Regional HD access CQI committee has representatives from local areas and sets overall goals. It also collects and analyzes data which is returned to stakeholders
- Each medical center has a local access committee consisting of renal care manager/access coordinator, nephrologists, vascular surgeons, interventional radiologists, nursing (facility staff), and administration for local implementation.
Education

- Kidney and Choices classes encourage vein preservation and early AVF creation; perioperative videos for patients
- Ongoing lectures and reprints for providers
- Updates for vascular surgeons on best practices at quarterly specialty meetings
Data Collection and Feedback

- Tracking tool is completed locally by MD or administrative staff and sent to region. Additional data from initial outpatient HD referral form and HD facility report cards.
- Annual report to stakeholders: Medical directors, nephrologists, VSs, IRs, renal care managers/access coordinators, and administrators.
- Each surgeon and his department chief gets a coded report on the incidence of AVF creation for comparison to peers. This is the first quality indicator ever used by GS chiefs.
- No personal financial pressure on surgeon regarding HD access.
## 2005 ESRD Demographics Report

### Active ESRD Population as of December 31, 2005

<table>
<thead>
<tr>
<th>Modality</th>
<th>No. of Patients</th>
<th>% of Patients by Modality</th>
<th>% of Patients w/ Diabetes</th>
<th>% of Patients ≥65</th>
<th>Average Age of Patients by Modality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemodialysis</td>
<td>3394</td>
<td>65%</td>
<td>64%</td>
<td>45%</td>
<td>62 yrs old</td>
</tr>
<tr>
<td>Peritoneal Dialysis</td>
<td>403</td>
<td>8%</td>
<td>58%</td>
<td>27%</td>
<td>55 yrs old</td>
</tr>
<tr>
<td>Transplant</td>
<td>1394</td>
<td>27%</td>
<td>38%</td>
<td>16%</td>
<td>52 yrs old</td>
</tr>
<tr>
<td>Regional Total</td>
<td>5,191</td>
<td>100%</td>
<td>56%</td>
<td>36%</td>
<td>58 yrs old</td>
</tr>
</tbody>
</table>

### ESRD Prevalence By Ethnicity

- **White**: 31.03%
- **Unknown/Blank**: 2.43%
- **Asian/Pacific Islander**: 10.40%
- **Black**: 21.17%
- **Other/Multiracial**: 3.53%
- **Hispanic**: 31.44%
2005 Vascular Access Outcomes Report

Initial (Primary) Non-Catheter Access

% of Initial (Primary) Non-Catheter Access that were Fistulas

2004 Average: 85%
2005 Average: 87%
2005 Vascular Access Outcomes Report

AV Fistula Prevalence

2005 Year-end Vascular Access Prevalence by Medical Center

- % Of dialysis patients using a catheter
- % Of dialysis patients using a graft
- % Of dialysis patients using a fistula

BP, PC, OC, LA, WH, SD, AV, FO, RI, BE, WL, BA, SB
2005 Vascular Access Outcomes Report

Non-Catheter Replacement Access

% that were Fistulas

2004 Average: 58%
2005 Average: 57%

OC  PC  BP  BA  WH  FO  AV  SD  LA  WL  BE  RI  SB

2004  2005

0%  10%  20%  30%  40%  50%  60%  70%  80%  90%
Percent of New Hemodialysis Patients using AVF at First dialysis, After 3 months of dialysis, and After 6 months of dialysis
Differences in incidence, prevalence, and thrombosis rates are significant at $P<0.001$. Linear-by-linear association test, StatXact–5.
Almost all patients can have an AVF--just not the same one.
“Access of Good vs Access of Evil”

- AVF has better patency
- AVF is associated with lower mortality and infection rate
- AVF requires fewer interventions?
- AVF has lower costs
- AVF creation is applicable to almost all patients
- AVF is easier to monitor with clinical exam
Reported Disadvantages of AVF

- Prolonged use of catheters
  - Venous stenosis
  - Catheter related bacteremia
- High early failure rate
- Benefit lost in some subgroups
- Inadequate vessels for construction of AVF because of changing demographics
Catheter Solutions

- Reduce Initial catheter usage
  - 61% in US vs 31% in Japan and Europe
- Reduce chronic catheter use
  - 21% in US vs 4-9% in Japan and Europe
- Make more functional fistulas sooner
  - 15% start with AVF in US vs 66% overseas
- AVF survival in Europe 2X US
- First cannulation at 3 months in US vs 1-2 months in Japan and Europe (>15 d ?)
- Use “RIJ vein” for almost all catheters

1st Year

- Fistula: $68K
- Graft: $76K
- Catheter: $87K

2nd Year

- Fistula: $50K
- Graft: $55K
- Catheter: $57K

Legend:
- Yellow: Outpatient
- Pink: Inpatient
- Orange: Physician
- Light Blue: HHA
- Dark Blue: SNF
- Cyan: Hospice
AVF Creation in the UE

- Snuffbox
- Radiocephalic
- Ulnar basilic
- Forearm transposition
- Forearm loop
- Antecubital
- Translocated
- Brachiocephalic +/- straight or loop transposition
- Transposed basilic vein
- Transposed brachial vein
- Translocated
- (External jugular vein - ECA)
- Bidirectional
AVF Creation in LE

- GSV leg, thigh, straight, loop, transposed, in-situ, spiral, composite, or translocated
- LSV leg, straight, loop, transposed, in-situ, spiral, composite, or translocated
- SFV/Popliteal vein thigh, straight, loop, transposed, composite, or translocated
Surgeon Ultrasound

- Bedside ultrasound of the extremities performed by the primary surgeon is essential to the development of optimal surgical judgement and technical success.

- There is no benefit to vein mapping performed by the vascular lab.
  - Need diameter and depth.

- Repeat ultrasound examination just prior to surgical prep improves perioperative success.
Surgeon Follow Up

- Periodic physical examination by the surgeon is the most sensitive means of dysfunctional fistula detection.
  - Outflow stenosis: hypertensive fistula, aneurysms, prolonged bleeding
  - Inflow stenosis: altered thrill, early collapse with arm elevation
- Balloon assisted maturation for complex reconstructions
Conclusions

- Prevalence of AVFs >60% is achievable in U.S.
- Teamwork, ongoing education at all levels, and data collection with feedback to stakeholders are essential elements of a successful program.
- Management of dysfunctional fistulas and reducing excessive catheter usage are increasing challenges.
Almost all patients can have an AVF--just not the same one.