Complications of Radial and Brachial Vascular Access in Chronic Hemodialysis

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Abstract

Background: Dialysis access is a vital lifeline for patients with renal failure. Accessing problems can be vexing and frustrating for both physician and the patient. The aim of this retrospective study is to evaluate the complications of creating two types of arteriovenous fistulas (AVF) in a consecutive series of chronic hemodialized patients.

Methods: The analysis was performed over 108 patients (44 females and 54 males). Among them, 57 (52.8%) had Radiocephalic (RF) Arteriovenous Fistulas and 51 (47.2%) had Brachial (BF) Arteriovenous fistulas (Brachiobasilic or Brachiocephalic).

We evaluated the patients for possible complications of their hemodialysis accesses by careful history taking and physical examination.

Results: Sixty two point nine percent of patients had at least one of the complications like Thrombosis, Pseudoaneurysm, Infection, Hand dysfunction and heart failure.

Conclusion: Diabetics and the patients who began hemodialysis with a hypertension had more complication rates. An increase in dialysis frequency is associated with more complication rate.

Key words: Arteriovenous Fistula, Vascular access, Hemodialysis

Introduction

Dialysis access is a necessary lifeline for renal failure patient. Accessing problems can be vexing and frustrating for the physicians and the patient. An AV fistula is a direct connection between the artery and vein. Arteriovenous fistulas are the vascular access of choice for daily hemodialysis. The most common sites for AV fistulas are the forearm and upper arm5. Multiple studies have been shown that native arteriovenous fistulae (AVF) have significantly higher patency and lower complication rates than grafts and catheters. They are the most effective and preferred forms of access surgery. Arteriovenous fistulas patency is one of the criteria that affect the patient's outcome and it is impossible to do sufficient hemodialysis with failed AV access.

It is best to perform these procedures before a patient needs dialysis1.2. Radiocephalic type of fistulas which involves a direct anastomosis of radial artery and cephalic vein at the wrist in the first choice. Many patients without suitable vessels in the forearm may be
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good candidates for construction of brachial fistulas (BF) in the upper arm. The aim of this retrospective study was to evaluate the complications of creating two types of arteriovenous fistulas (AVF) in a consecutive series of chronic hemodialyzed patients.

Patients and Methods
This study was performed within nine month from April to December 2002 in Baghytallah (a.s.) and 15th Khordad Hospitals. One hundred and eight (44 females and 64 males) consecutive patients who were on hemodialysis at least for 6 months were included in one of the two groups. Group I: 57 patients who used RF fistula and Group II: 51 patients who used BF fistula for chronic hemodialysis. All patients had one of Radial (RF) or Brachial (BF) hemodialysis accesses. Other types of the accesses were excluded from this study.

At the beginning of hemodialysis, 35 patients were diabetic and 66 had systolic hypertension above 160 mmHg.

Long-term complications of hemodialysis access was evaluated by careful history taking and physical examination. The patients were evaluated for long-term complications of their hemodialysis accesses like thrombosis (history of previous thrombectomy or revision due to poor flow), pseudoaneurysm, infections, hand dysfunction (any edema, neuropathy, ischemia or postoperative pain) and congestive heart failure.

Demographic data between the two groups are listed in table-1.

Table-1: Comparison of Demographic Data Between The Two Groups of Patients Who Received Radial (RF) or Brachial (BF) AV Fistula

<table>
<thead>
<tr>
<th>AVF Type</th>
<th>RF</th>
<th>BF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age±SD (ye)</td>
<td>59.1±8.2</td>
<td>62.3±9.7</td>
</tr>
<tr>
<td>Female, n(%)</td>
<td>20 (18.5)</td>
<td>24 (22.2)</td>
</tr>
<tr>
<td>Male, n(%)</td>
<td>37 (34.3)</td>
<td>27 (25.6)</td>
</tr>
<tr>
<td>Total</td>
<td>57 (52.8)</td>
<td>51 (47.2)</td>
</tr>
</tbody>
</table>

Results
Sixty two point nine percent of patients had at least one of the complications like Thrombosis, Pseudoaneurysm, Infection, hand dysfunction or heart failure. The overall complication rates for the RF and BF fistulas were 61.4% and 64.7% respectively. There were no statistically difference in complication rates between the two groups. Diabetics and the patients who began hemodialysis with hypertension had more complication rates (71% and 78%, respectively).

Forty-three (39%) patients were on weekly chronic hemodialysis, two times or less. Sixty-one (61%) patients were on chronic hemodialysis for more than two times a week. The overall complication rates appeared to increase with increasing in frequency of puncturing for hemodialysis in a week (p<0.001).

Among the patients, 42 (39%) of the fistulas were made by expert vascular surgeons and 66 (61%) were created by the other surgeons with less experience. Complication rates were higher in the latter group (45% vs. 72%, p<0.001).

A non statistically significant increase in complication rates for these accesses was found in females. The reason for this is unclear and requires more investigation. Complications in males and females are listed below in table-2.

Table-2: Comparison of Complications in Males and Females

<table>
<thead>
<tr>
<th>Complications</th>
<th>Male(64) n(%)</th>
<th>Female(44) n(%)</th>
<th>Total(108) n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RX of Thrombosis*</td>
<td>8 (12.5)</td>
<td>5 (11.4)</td>
<td>13 (12.0)</td>
</tr>
<tr>
<td>Pseudo-Aneurysm</td>
<td>8 (12.5)</td>
<td>9 (20.45)</td>
<td>17 (15.7)</td>
</tr>
<tr>
<td>Heart Failure</td>
<td>2 (3.12)</td>
<td>3 (6.8)</td>
<td>5 (4.6)</td>
</tr>
<tr>
<td>Infection</td>
<td>5 (7.6)</td>
<td>8 (18.1)</td>
<td>13 (12.0)</td>
</tr>
<tr>
<td>Hand Dysfunction**</td>
<td>19 (29.5)</td>
<td>36 (78.5)</td>
<td>54 (50.0)</td>
</tr>
</tbody>
</table>

*RX of Thrombosis: Previous thrombectomy or revision due to poor flow
**Hand dysfunction: Any edema, neuropathy, ischemia or postoperative pain
Discussion
The results of this study showed that long term successful placement of the first fistula can be achieved in 37% of the patients. In present study both technical problems and quality of caring were strongly associated with the outcome of fistulas. Long term postoperative complication rate between the Radial and Brachial fistulas were not statically different.

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References

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