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Basilic Vein Transposition Arteriovenous Fistulas in Nakornping Hospital

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Abstract Increasing the prevalence of arteriovenous fistula over arteriovenous synthetic graft is critical for decreasing the morbidity and costs of dialysis patients. The basilic vein was another source of autogenous vein for the creation of an arteriovenous fistula.

A retrospective review of 24 patients undergoing basilic vein transposition (BVT) arteriovenous fistula in two steps technique was carried out between January 2002 and December 2006.

Of the twenty-four patients underwent BVT, eighteen (75%) proceeded to the second step and already receiving hemodialysis. Perioperative complications included two hemotamas, and one infection. BVT had high patency rates and the advantage of two steps technique was to decrease number of undergoing patients the second step operation which large incision and morbidity.

Key words: **arteriovenous fistulas, basilic vein transposition**

Introduction

The primary use of autogenous arteriovenous fistula (AVF) for chronic hemodialysis access is recommended by the National Kidney Foundation-Dialysis Outcomes Quality Initiative (NKF - DOQI) in its practice guidelines.[1] The guidelines were based on an extensive review of the available literature with goal to make dialysis both more safe and more cost-effective. Because of NKF - DOQI, there has been a resurgence of enthusiasm in placing primary AVF and subsequently more interest in alternative autogenous fistula techniques. The basilic vein transposition (BVT) arteriovenous fistula described in 1976 by Dagher et al.,[2] is enjoying a renewed popularity as surgeon strive to increase autogenous fistula creation rates. Well - described advantages of using AV fistulas include increased patency rates and decreased infection rate compared with prosthetic grafts.[3,4] Potential disadventages include a more technically difficult surgical procedure, increased length of time to maturation, and a potentially higher risk of wound complications. This study reviewed experiences with BVT, particularly in pa-

tients with prior access failures, as well as to promote efficient use of aviable access sites.

Methodology

A retrospective analysis was carried out covering of consecutive patients who underwent BVT for hemodialysis access between January 2002 and December 2006. In practice, the first attempt was always a wrist radiacephalic fistula if anatomically favorable. From then on it was moved to simple brachiocephalic fistula at antecubital fossa. Only if this was not feasible, BVT was operated in a two-step technique, the first step was creation of an AVF between the basilic vien and brachial artery without transposition of vein to a more superficial plane. The created fistula was allowed to mature for 3 months, after which the diameter was checked. If it was mature with venous diameter of ≥ 0.4 cm, the second step procedure was performed with transposition by long incision along the basilic vein. Descriptive statistics were used in data analysis.

Results

During the 5 year study period, a total of 514 patients underwent creation of AVF for hemodialysis access. There were only 24 (4.67% of the total) patients who underwent creation of BVT in the first step (or brachiobasilic fistula) because they failed from the previous operations on cephalic vien in wrist or antecubital fossa that it was not proper to creation of AVF. After 3 months, eighteen of the patients (75%) had mature basilic viens for the second step (or transposition) while the other six patients (25%) failed to mature as shown in Fig. 1.

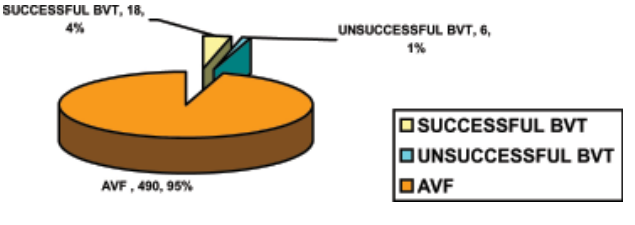

Figure 1 Patients of AVF

The clinical characteristics of the study group were described in Table 1.

The averages of operation times in the first and the second step were 57.3 minutes and 54.9 respectively. Perioperative complications were reportedly one hematoma in the first step and two hematomas in the second step with one infection. (Table 2)

Discussion

Ever since the report of the first surgically created arteriovenous fistula for hemodialysis 4 decades ago, vascular access has been encouraged as the NKF-DOQI guidelines because they are associated with decreased rates of infection and failure and increased average patency. The order of preference for arteriovenous access placement is as follows

Table 1 Patients characteristics (n=24)

Patients characteristics	**n = 24**
Age (range) (years)	47.2 (23-67)
Gender patient	
Male	13
Female	11
Comorbidity (%)	
Diabetes	5 (20.8)
Hypertension	19 (79.2)

Table 2 Clinical data

	The first step operation	**The second step operation**
Operative time (range)	57.3 minutes (43-104 minutes)	54.9 minutes (35-127 minutes)
Perioperative complication		
Mortality	-	-
Hematoma	1	2
Infection	-	1

1. Wrist radiocephalic AVF
2. Brachiocephalic AVF at elbow
3. Upper arm BVT
4. Arteriovenous graft

The BVT has been advocated as an alternative hemodialysis access. First described by Dagher et al. and reported a patency rate of 70 percent within 8 years [5], the BVT involves transposing the basilic vein, usually located deep in the subcutaneous tissues where it is not accessible to simple percutaneous in a move to superficial location along the volar surface of upper arm. This procedure requires extensive mobilization of the vein with major disadvantages including the potential for vein injury during the required mobilization and wound complications associated with extensive dissection, such as hematoma or injury to the median or cutaneous nerves. So that BVT was separated into two-step technique with an advantage that decreased about 25 percent of patients unable to proceed to the second step operation because the vein failed to maturation. In this report, the maturation rate of BVT was acceptable at 75 percent and is consistant with previously described rates ranging from 62 percent to 95 percent.[6] The maturation of AVF revealed that a minimum venous diameter of ≥ 0.4 cm was associated with adequacy of dialysis in 67 percent of fistula and blood flow rate of ≥ 500 ml/min was associated with an adequate AVF in 70 percent of cases, when both variables were met, 95 percent of fistulas were adequate for dialysis.[7]

There are various reasons for an AVF to undergo maturation failure in six patients (25%).

1. Failure of arterial dilation The experimental studies demonstrate that the creation of an AVF results in an increase in shear stress, which causes vascular dilation in an attempt to return shear stress, which causes vascular dilation in an attempt to return shear stress levels back to normal. In an effort to create AVF in patients with severe vascular disease and diabetes, however, it is possible that the conventional wisdom about the linkage between high shear stress rates and vascular dilation may not have the ability to secrete the mediators that are required for flow-mediated vasodilation.[7-9]

2. Failure of venous dilation Similar reasons may also result in a failure of venous dilation. In addition, the aggressive push toward trying to create a native AVF whenever possible could result in the use of a poor venous segment that has lost the ability to vasodilate because of previous venipuncture. Genetic polymorphisms for mediators that favor either vasodilation or vasoconstriction also could play a role in both arterial and venous dilation/constriction.[10]

3. Accelerated venous neointimal hyperplasia

1) As a result of AVF configuration

There are many different configurations for the creation of an AVF, all of which may result in differing levels of shear stress at different points in the venous segment. In particular, there may be multiple areas of low shear stress at the arteriovenous anastomosis because of differences in compliance between the artery and the vein. These regions of low shear stress could result in focal areas of neointimal hyperplasia and vasoconstriction as occurs clinically in the context of the common juxta-anastomotic stenosis, which currently is the single most important reason for an AVF to fail to mature.

2) As a result of vascular injury

The segment that is most frequently affected with venous stenosis and is associated with early AVF failure is the segment that has been mobilized and manipulated by the surgeon during the procedure. This process often involves stretching, torsion, and skeletonizaion of the vessel. Skeletonization of the vessel may disrupt the vasa vasorum for that segment of vein. Whether these factors adversely affect the AVF and result in the lesions that are observed in this

region is not clear; however, the possibility must be considered[11].

The number of patients on dialysis continues to increase contributing to more demand BVT in order to improve survival of patients on dialysis by the more long lasting and, requiring fewer revisions and lower infection rate. To decrease morbidity from large incision, the two step BVT was another more attractive and preferable option.

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บทคัดย่อ **การผ่าตัดย้ายหลอดเลือดดำเบสิลิคเพื่อใช้ฟอกไต ในโรงพยาบาลนครพิงค์**

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กลุ่มงานศัลยกรรม โรงพยาบาลนครพิงค์ จังหวัดเชียงใหม่

วารสารวิชาการสาธารณสุข **2551; 17:115–9.**

เป็นที่ยอมรับมากขึ้นแล้วว่า การผ่าตัดหลอดลือดเพื่อใช้ฟอกไต โดยใช้หลอดลือดผู้ป่วยเองดีกว่าหลอดเลือดเทียม เพราะมีค่าใช้จ่ายและโรคแทรกซ้อนน้อยกว่า หลอดเลือดดำเบสิลิคเป็นหลอดเลือดเส้นหนึ่งที่นำมาใช้สำหรับหลอดเลือดเพื่อใช้ฟอกไต

การศึกษาทบทวนย้อนหลังครั้งนี้ ทำตั้งแต่มกราคม 2545 ถึง ธันวาคม 2549 ในผู้ป่วยจำนวน 24 คน ซึ่งได้รับการผ่าตัดหลอดเลือดดำเบสิลิค พร้อมกับย้ายหลอดเลือดเพื่อให้ง่ายสำหรับใช้แทงเข็มสำหรับฟอกไต ซึ่งแบ่งเป็น 2 ขั้นตอน

ในจำนวนผู้ป่วยที่เข้ารับการผ่าตัดหลอดเลือดดำเบสิลิคและย้ายหลอดเลือด 24 คน พบว่าผู้ป่วย 18 คน คิดเป็นร้อยละ 75 ได้รับการผ่าตัดในขั้นที่ 2 และหลังผ่าตัดสามารถนำไปใช้งานได้ พบโรคแทรกซ้อนมีก้อนเลือด 2 คน และติดเชื้อ 1 คน นอกจากนั้นพบว่าข้อได้เปรียบของการผ่าตัด 2 ขั้นตอน คือ ลดจำนวนผู้ป่วยบางส่วนที่ไม่ต้องทำการผ่าตัดขั้นที่ 2 ซึ่งแผลผ่าตัดจะใหญ่ และมีโรคแทรกซ้อนมาก

คำสำคัญ: **การผ่าตัดหลอดเลือดสำหรับฟอกไต, การผ่าตัดย้ายหลอดเลือดดำเบสิลิค**