SHORT REPORT

Unrecognized Basilic Vein Variation Leading to Complication during Basilic Vein Transposition Arteriovenous Fistula Creation: Case Report and Implications for Access Planning

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Abstract

Introduction: Knowledge about variations of the venous arm anatomy is limited despite its importance for a successful arteriovenous fistula creation.

Report: We describe a complication of a Basilic Vein Transposition (BVT) resulting from failure to recognize aberrant anatomy. The brachial–basilic junction was located in an unusual position near the antecubital fossa leading to inadvertent distal brachial vein ligation and transposition of basilic and the proximal and unusually unpaired brachial vein.

Discussion: This case highlights the prevalence of anomalies of upper extremity veins and the need for thorough Duplex vein mapping before surgery for the preservation and planning of future access.

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Introduction

Basilic vein transposition (BVT) arteriovenous fistula was first described by Dagher in 1976;1 Since then, several studies have demonstrated it to be the most reliable and dependable secondary vascular access procedure with a long term patency of 70% at 8 years.2 Renewed interest occurred since the release of the National Kidney Foundation-Dialysis Outcomes Quality Initiative (NKF-DOQI),3 and BVT is recommended before placement of an arteriovenous graft (AVG).4 Despite the relevance of the venous arm anatomy to successful proximal fistula creation the knowledge of variations remains limited. We describe a complication of BVT resulting from failure to recognize aberrant anatomy leading to inadvertent ligation of the distal
brachial vein and transposition of both basilic and proximal brachial vein.

Report

A 40-year-old woman with history of end stage renal disease secondary to diabetes and preeclampsia had a left BVT performed at an outside Hospital. The fistula failed to mature and she switched to peritoneal dialysis briefly and then came to us for access evaluation.

A vein mapping demonstrated that the basilic and cephalic systems were exhausted, the brachial vein at the antecubital fossa was patent, and so a forearm loop graft was placed. Shortly after, she developed severe upper extremity edema. A fistulogram was performed to investigate the cause demonstrated interruption of normal flow through the brachial vein presumably at the site of the prior BVT (Fig. 1). Instead there were numerous collaterals. A venogram of the right arm was done for further access planning, demonstrating the aberrant anatomy we believe was present on the left arm with a low junction of the basilic vein with a single brachial vein (Fig. 2A and B). The graft was subsequently ligated and the patient later underwent renal transplantation.

Discussion

The accepted anatomy of the upper arm veins involves a pair of brachial veins running parallel to the brachial artery and a basilic vein which runs along the medial side of the arm, and then diving more proximally to join with the paired brachial veins near the axilla. The traditional anatomy texts offer little description of the upper arm veins and are particularly silent in regards to variations.5 Systematic searches of the medical literature revealed no results for anatomical surveys of the confluence of the brachial and basilic veins.

In the present case report, the basilic vein joined a single unpaired brachial vein near the elbow, leading to transposition of the entire venous outflow of the upper arm.

Figure 1  Left arm venogram demonstrating interruption of normal flow through the brachial vein at the site of the prior BVT. The presence of numerous collaterals arising from the site, including large collateral along the medial side of the arm superficially and collateral from the site of the prior BVT towards the axilla.

Figure 2  A.B. Schematic drawing and right upper extremity venogram demonstrating the unusual anatomy. A single unpaired brachial vein running the length of the arm (I), the basilic vein enters the brachial vein relatively distal to the usual location and closer to the antecubital fossa (II).
arm. If the brachial vein had still been paired at this location, the effects would have been minimal, as the remaining fork of the brachial could accommodate the inflow. However, the brachial vein had already merged to become one vessel, or if there was only a single brachial vein to begin with, as in our patient, then the deep system of venous return is cut off. Even in this instance, the remaining superficial veins and collaterals can usually compensate for the loss. The trouble arises if the patient later needs an AVG. When a graft is connected to the brachial vein distal to the point of ligation, blood is shunted at high pressures into a vessel with no proximal outlet, causing severe swelling, as demonstrated by our patient.

Failure of the basilic fistula in this patient led to exhaustion of venous outflow options in this arm. Preserving future access options is crucial when planning access surgery since most shunts have a limited lifespan. Recognition of this anatomic variation has lead to more careful planning in sequence of access procedures for patients and often a forearm graft is chosen before a basilic transposition, despite current KDOQI guidelines. This case emphasizes the influence of venous anatomical variability on access outcomes.

**Conflict of Interest**

The authors have no competing interests to declare and received no financial contributions.

**References**