SURGICAL PEARLS ABSTRACTS

Arteriovenous Malformations of the Hand Case Series: Technical Challenges and Significance of Palmar Arch Reconstruction

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BACKGROUND: Arteriovenous malformations (AVMs) are high-flow congenital vascular anomalies consisting of an abnormal vascular network in which arterial blood flow directly connects to venous drainage. Hand AVMs post a significant challenge given the functional importance of the hand and high recurrence rate of AVMs. This study presents our early experience with treating hand AVMs using complete surgical excision and palmar arch reconstruction.

METHODS: A retrospective review was performed on all patients with hand AVMs who underwent surgical excision at our institution between 2014 and 2018. Operative management involved ray amputation and/or excision of the palmar arch. The palmar arch was reconstructed in the majority of the cases with saphenous vein graft or uninvolved common digital arteries. Patient demographics, operative details, and postoperative courses were recorded.

RESULTS: A total of 4 patients were included in this study. Mean patient age was 32 years. All patients presented with a pulsatile swelling, ulceration, and limited function. Arteriograms demonstrated high-flow AVMs with ulnar artery dominance. Three patients underwent excision of the palmar arch and involved ulnar artery. Additional reconstruction with a lateral arm free flap was required in one patient. All patients had excellent recovery with no complications. In patients who underwent palmar arch reconstruction, symptoms completely resolved with no recurrences. Although no gross recurrence is evident in the only patient whose arch was not reconstructed, persistent high pulses can still be appreciated. Patients were followed for a mean of 2.3 years.

CONCLUSIONS: Given precise dissection and microsurgical technique, high-flow AVMs of the palm and fingers can be successfully managed in select cases with wide local excision and immediate palmar arch reconstruction. Our early experience suggests that reconstructing the arch can possibly prevents the postoperative collateralization from adjacent arteries and re-expansion of the lesion.

Below-the-Knee Amputation With Targeted Muscle Reinnervation: Operative Technique and Technical Pearls of an Interfascicular Superficial Peroneal Nerve Targeted Muscle Reinnervation

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INTRODUCTION: Targeted muscle reinnervation (TMR) is a nerve transfer technique by which the severed ends of sensory nerves are transferred to expendable donor motor nerves to minimize pain. TMR has successfully been used to reduce residual limb and phantom limb pain in patients with upper and lower extremity amputations. For patients with below-the-knee amputations (BKAs), the tibial nerve and superficial peroneal nerve (SPN) are the most common sensory nerves addressed with TMR. Although the tibial nerve coaptation is well-protected by the deep posterior musculature, the SPN coaptation is commonly positioned at the weight-bearing portion of the stump without significant soft tissue padding. This study details a novel interfascicular SPN TMR technique performed through a proximal incision at the fibular head.

TECHNIQUE: TMR performed primarily at time of BKA is offered to all patients with hand AVMs who underwent surgical excision at our institution between 2014 and 2018. Operative management involved ray amputation and/or excision of the palmar arch. The palmar arch was reconstructed in the majority of the cases with saphenous vein graft or uninvolved common digital arteries. Patient demographics, operative details, and postoperative courses were recorded.

TECHNIQUE: TMR performed primarily at time of BKA is offered to all patients preoperatively to prophylactically reduce pain. TMR is also offered secondarily to patients who develop severe neuroma or phantom limb pain after their amputation. When performed primarily, TMR is performed on the SPN and tibial nerve. When performed secondarily, TMR is performed on the involved nerves based on clinical exam. The SPN TMR is performed through an approach to the common peroneal nerve (CPN) at the fibular head. Accessing the CPN at this level allows for complete decompression of the CPN through the peroneal tunnel. An internal neurolysis is performed, and a nerve stimulator is used.