Brachioradialis Flap for Soft Tissue Coverage of Posterior Elbow Wounds: Case Report and Surgical Technique

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PURPOSE

The goal of this study was to describe the brachioradialis (BR) rotational flap, an alternative option for soft tissue coverage of the posterior elbow that can be used primarily or when other options fail.

CASE DESCRIPTION

A 72 year-old right-hand dominant woman with advanced rheumatoid arthritis on chronic immunosuppression presented with a chronic draining wound on the posterior elbow after failed anconeus muscle flap **(Figure 2).** A BR rotational flap was utilized to cover this defect **(Figure 3)**.

Figure 2: Persistent, chronic draining wound on the posterior aspect of the olecranon

Interval history:

- Septic olecranon bursitis → draining right elbow wound
- Failed non-operative treatment (local wound care, MIST therapy, IV and oral antibiotics, 6 weeks of immobilization)
- Failed anconeus muscle flap coverage
  - Persistent draining sinus requiring further surgical debridements leading to devitalization of the flap
- Polymicrobial infection with Methicillin-sensitive *Staphylococcus aureus and* Group G *streptococcus*
- Radiographs negative for signs of osteomyelitis

1 year follow-up after BR flap:

- Full wound healing **(Figure 4)**
- Elbow prominence very well padded
- Full/painless elbow range of motion 0 to 135 degrees
- Insignificant functional loss from the BR muscle harvest
- Patient reported very high satisfaction with the results
- No postoperative complications

Figure 5: One year post op incision well-healed.

SURGICAL TECHNIQUE

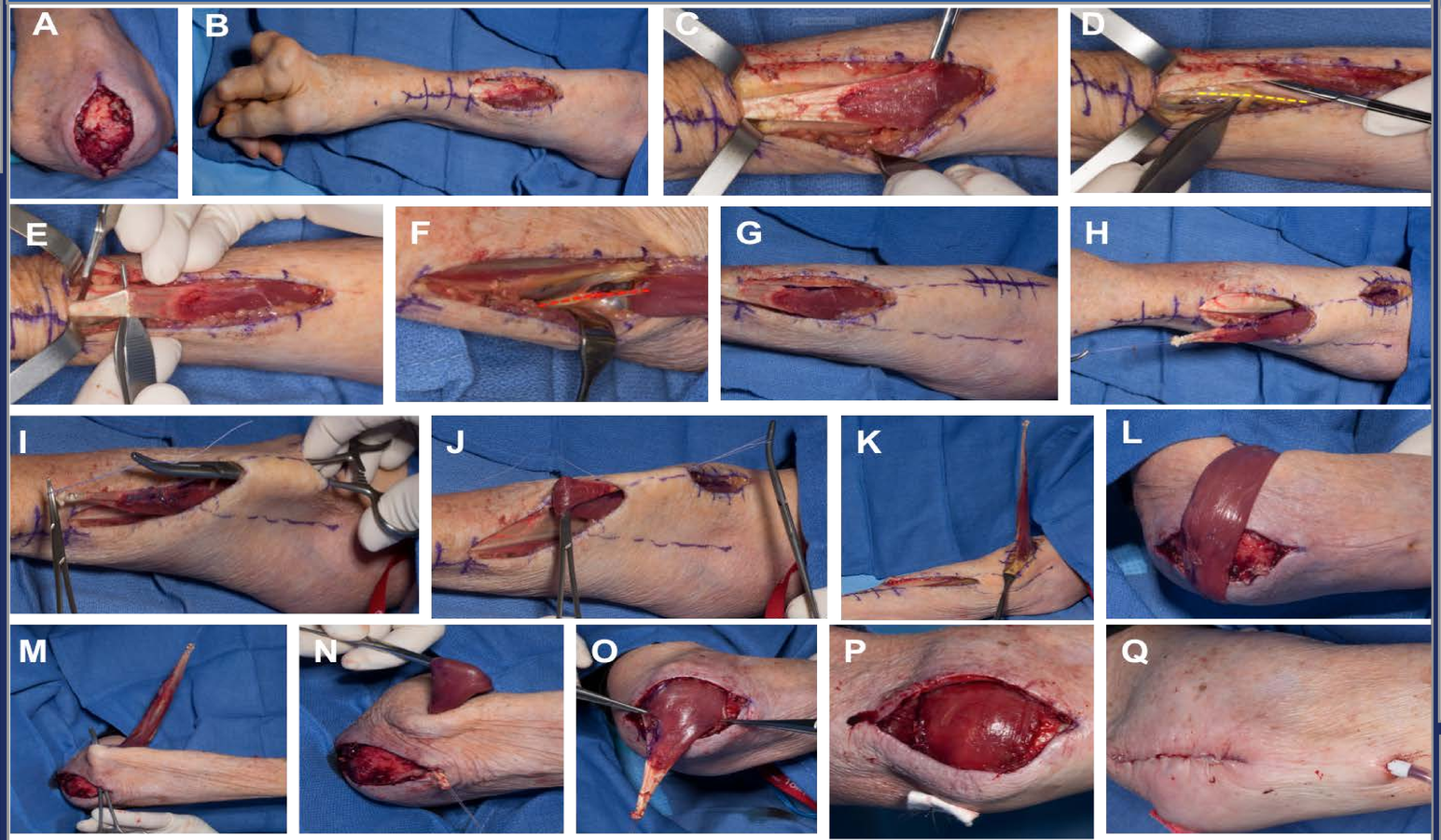

Figure 3: (A) After debridement of the wound in **Figure 2**, a large soft tissue defect remains measuring 8cm x 4cm. **(B)** Harvest of the tendinous portion of BR from the distal radius. **(C)** BR mobilized from the musculotendinous junction to the distal tendon and released from radial styloid**. (D)** Identification of the superficial branch of the radial nerve (yellow dashed line) as it emerges from the BR fascia about 9 cm proximal to the radial styloid. **(E)** Detachment of the BR tendon. **(F)** Identification of the intramuscular communicating branches of the radial artery (red dashed line). **(G)** The incision site just distal to the elbow crease is marked along the radial border of BR. **(H)** The BR flap prior to passage under the subcutaneous tissues to the destination site**. (I)** Blunt dissection is used to create a tunnel between the anterior forearm wound and the elbow wound. **(J)** The flap is passed subcutaneously and retrieved at proximal incision just distal to elbow crease. **(K)** The flap is pulled through the tunnel from proximal to distal. **(L)** The length of the flap is checked by draping it over the posterior elbow wound. **(M)** A Krakow stitch is used for the tendinous portion of the BR. A tunnel is created in the subcutaneous tissues to pass the flap from anterior to posterior. **(N)** Passing the tendinous portion through the wound. **(O)** The flap is then draped over the wound and sutured to the surrounding tissue. **(P)** The tendinous portion is tagged with Nylon which is brought percutaneously through the skin and sutured over a piece of felt to maintain the muscle in place until it has healed. **(Q)** Drain placement and primary skin closure over the flap. The donor sites are then closed in a subcuticular fashion. A well-padded elbow extension splint is placed and kept for two to three weeks to reduce tension over the graft site. Weight bearing is limited through the operative extremity until the wound is fully healed. After a period of two to three weeks, and once the flap shows signs of healing, the felt is removed and range of motion at the elbow can be slowly introduced.

CONCLUSIONS

The BR muscle flap is a valuable alternative for coverage of **large soft tissue defects** of the posterior elbow.

- **Versatile due to large muscle belly:**
  - Average length and width : 17 cm x 4 cm
  - Thickness of approximately 2.6 cm
  - Excellent padding of bony prominences
- **Arc of rotation supports excellent coverage of posterior and posterolateral elbow**
  - Better posteromedial coverage by completely detaching muscle belly from its origin
    - Increase arc of rotation 1.6 cm medially
- **Consistent and robust blood supply**
  - Major pedicle from radial recurrent artery (RRA)
- **Minimal donor site morbidity and minimal functional loss**
  - BR muscle acts mainly as a weak forearm flexor and secondary pronator
- **Limitations:**
  - Possible injury to the superficial branch of the radial nerve (SBRN)
  - Risk of injury to intermuscular branches from radial artery proper during flap elevation compromising flap vascularity

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DISCLOSURES

Orlando D. Sabbag: No disclosures
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