An atraumatic technique of harvesting of the radial artery using harmonic scalpel: a video presentation

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The radial artery exhibits many anatomic, surgical and histologic advantages over other alternative arterial conduits. Microscopically, the radial artery has considerably thicker media containing a high density of smooth muscle cells as compared with the internal mammary artery and right gastroepiploic artery. Presence of thicker media makes the anastomoses technically easier, but it also predisposes the artery to spasms [1-5]. Electrocautery injury is also an important factor for suboptimal results with arterial conduits [1-5]. The harmonic scalpel is emerging as a useful alternative to electrocautery with the advantage of fast, safe, spasm-free harvesting and minimal use of hemoclips for arterial branches [5].

We present here-in the technical details of harvesting the left radial artery in a 60-year-old man undergoing coronary artery bypass grafting. The radial artery has been harvested atraumatically using a harmonic scalpel (Ethicon Endosurgery LLC, Johnson & Johnson Company, Guaynaba, Puerto Rico, USA) and two vesiloops by “No touch” technique, thereby preventing perioperative spasm. The postoperative recovery was uneventful.

Surgical technique

1. After performing Allen’s test, the non-dominant left upper arm is selected as the harvest site. The non-dominant forearm is surgically prepped circumferentially and draped from mid arm to hand.
2. The forearm is extended and supinated directly perpendicular to the patient’s torso.
3. A curvilinear incision is made extending from approximately 2 cm below the antecubital crease along the length of the forearm to the wrist crease of the patient.
4. The incision parallels the medial edge of the brachioradialis muscle.
5. The skin and subcutaneous tissue are incised down to the fascia overlying the flexor carpi radialis muscle.
6. The fascial sheath overlying the superficial muscle is divided using electrocautery between 15-20 mv between the brachioradialis and flexor carpi radialis muscle. Care is taken not to injure the lateral cutaneous nerve overlying the brachioradialis muscle by displacing it laterally.
7. A self-retaining retractor is placed between the brachioradialis and flexor carpi radialis muscle. This maneuver reveals the entire course of the radial artery from the biceps tendon to the radial styloid.
8. Two vessel loops are placed on two extremes of the radial artery using a mosquito artery forcep without injuring any perforator arteries.
9. The radial artery is gently mobilized to lift it from its muscular bed using a harmonic scalpel. As the pedicle is lifted, the side branches of the radial artery are exposed. The side branches are ligated with the harmonic scalpel. Careful, gentle and progressive upward traction of the pedicle is performed.
10. After mobilizing the entire radial artery pedicle, the radial artery is compressed digitally to document the retrograde pulsation through ulnar collateral circulation. The finger oximetry probe is also checked for a pulsatile wave with radial artery being digitally occluded.
11. After systemic heparinization, the proximal end of the radial artery is doubly ligated with 2-0 silk suture and transfixed using 3-0 polypropylene suture (Johnson and Johnson Ltd., Ethicon, LLC, San Lorenzo, USA).
12. Next, the distal end of the pedicle is doubly ligated using 2-0 silk suture along the length where the radial styloid meets the radial pedicle and transfixed using 3-0 polypropylene suture also.
13. A marking pen is being used over the radial artery pedicle to avoid later twisting.
14. A small olive tip internal mammary artery cannula is used for cannulating the proximal end of the graft and gently flushed the entire graft using heparinized saline followed by papaverine, being careful not to over distend the vessel.
15. Two bulldog clamps are being placed on both ends of the radial artery and papaverine solution is retained within the graft.
16. The entire radial artery pedicle graft is inspected to ensure that all side branches are ligated securely.
17. The harvested graft is kept in a small bowl containing papaverine solution (1 mg papaverine in 1 ml saline).

Conflict of interest
The authors declare no conflict of interest.

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References