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Are calcium antagonists necessary to all patients with radial artery during off-pump coronary surgery?

Abstract

We have made distal radial artery pressure measurement and compared it to another preoperatively cannulated radial artery pressure in order to evaluate the necessity of calcium channel blockers during and after off-pump surgery. If there was more than 20 mmHg gradients between two arms we decided to use calcium channel blockers. Significant pressure gradient (>20 mmHg) was detected in only two percent of our patients.

Keywords: Radial artery harvesting, induced spasm, off-pump coronary surgery

INTRODUCTION

Calcium channel blockers (CCBs) and nitrates in order to reduce radial artery (RA) vasospasm are in widespread use. Most clinical studies provide an evidence for their benefit (1-3). CCBs are routinely used in most cardiac centers (4-6). Royse AG (7) think that the spasm of RA is uncommon and a spasm may occur in the setting of rough dissection. Excessive traction and the use of blunt rather than sharp dissection results in localized spasm. Meticulously harvesting may avoid RA spasm in most patients. Our main purpose is quantitatively approach to radial artery spasm. We have investigated how often radial artery spasm would develop during radial artery harvesting.

SURGICAL TECHNIQUE

Preoperatively Allen's test is performed on all patients. Right

radial artery is cannulated for arterial pressure monitoring. Then chest, left arm and legs are draped. Left internal thoracic artery, saphenous vein and radial artery are harvested concomitantly. The arm incision for radial artery extends from 1 cm medial and distal to the biceps tendon at the elbow to 1 cm medial and proximal to the radial styloid process. Diathermy is used to divide tissues to the deep fascia. Care is taken to avoid damage of arm nerves. We use small metal clips close to the RA and then divide the branch using scissor. Satellite veins are gently grasped not the RA itself during harvesting to avoid localized spasm. RA is divided distally just proximal to the wrist and observed bleeding into the atmosphere. Arterial cannula is advanced into radial artery and realtime recordings with other radial artery arterial line are recorded (Figure 1).

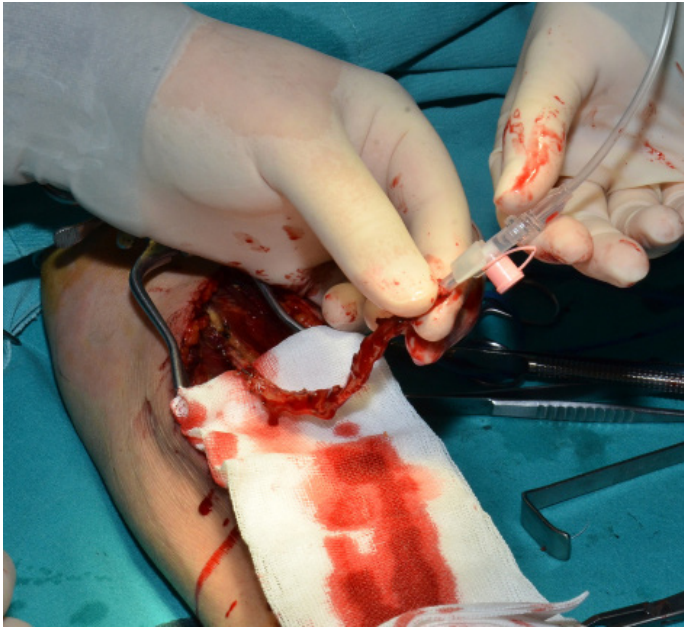


Figure1. Measurement of pressure through the radial artery

If there is more than 20 mmHg gradients between two arms we decide to use calcium channel blockers. Significant pressure gradient (>20 mmHg) is detected in only two percent of our patients. Then proximal part of radial artery is dissected and all blood is evacuated from the RA and rinsed with heparine solution and stored in a 37°C saline solution. Intraluminal probing is not routinely done of our patients. Radial incision was closed without deep fascia appoximation to avoid compartment syndrome. The arm is bandaged immediately without a drain. If we detected a significant gradient on harvested radial artery graft, firstly gentle intraluminal probing is done then flushed with diltiazem and papaverine solution just after the proximal parts dissected and RA stored in a 37°C saline solution. Off pump coronary surgery is performed on all patients. We strive to keep patients warm at 37°C temperature. We do not routinely use calcium channel blockers in non- spastic radial arteries in the postoperative period. Diltiazem infusion is done and oral diltiazem (120-180 mg daily) is administrated in postoperative first month, in spastic radial arteries.

DISCUSSION

Despite the widespread adoption of increasing use of RA conduit use during CABG, pharmacologic prophylaxis for postoperative RA vasospasm remains unsolved. Most studies have demonstrated that CCBs would not resolve a radial artery spasm (1-4). Radial artery is skeletonized to reduce the incidence of vasospasm (5,6) in some cardiac centers. They have used an ultrasonic scalpel for skeletonization and intraluminal injection of milrinone to reverse vasospasm. They think that the skeletonized radial artery responds well to the intraluminal injection of vasodilators because of a lack of the adventitia (5,6). Royse AG (7) pointed out that spasm of RA is uncommon and spasm may occur in the setting of rough dissection. Excessive traction and the use of

blunt rather than sharp dissection results in localized spasm. I think the most important question is "are CCBs really necessary to all RA patients?". We have quantitatively approached to radial artery patients by using distal pressure measurements and compare them with another arm. We have found that only 2% (three in 150 patients) of our patients suffer spasm of the RA during harvesting and require CCBs. I think that meticulously harvesting may avoid an RA spasm in most patients and the storage of RA in warm solution (37°C saline solution) during off-pump surgery also avoids radial artery spasms. Our spastic radial artery patients (two patients) have low body surface area ($\text{BSA} < 1.50 \text{ m}^2$). Our radial artery patency rate is competible with other radial artery studies (8).

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