University Heart Journal
Vol. 9, No. 2, July 2013

Initial Experience of Coronary Angiogram through Trans Ulnar Route in Bangabandhu Sheikh Mujib Medical University

MD. ABU SALIM, SYED ALI AHSAN, MD. ABU SIDDIQUE, SAJAL KRISHNA BANERJEE, AKM FAZLUR RAHMAN, CM AHMED, HARISUL HOQUE, MD SHAFIUDDIN, SM MUSTAFA ZAMAN, AHSAN HABIB, DIPAL KRISHNA ADHIKARY, JAHANARA ARJU, TANJIMA PARVIN, MANZOOR MAHMOOD.

Department of Cardiology, Bangabandhu Sheikh Mujib Medical University, Dhaka.

Address for Correspondence: Dr. Md. Abu Salim, Assistant Professor, Department of Cardiology, Bangabandhu Sheikh Mujib Medical University, Dhaka. E mail - drsalimsn@hotmail.com

Abstract:

For performing Coronary angiogram and PCI Trans ulnar route is a feasible alternate access. It has got all the advantages of transradial route. Beside that by this approach radial artery can be spared to be used as a conduit for subsequent surgical revascularization. The hardware used for both transulnar and transradial routes are similar. In our study technical success rate is 93.99% through transulnar route, 6.66% case was postponed due to failure to canulate the ulnar artery. The complications such as local hematoma, significant swelling, access site bleeding, ulnar artery perforation and reversible parasthesia was nil (0% of patients). Post procedure asymptomatic ulnar artery occlusion did not occur.

Introduction:

Percutaneous Coronary Interventions (PCIs) are commonly performed via the femoral route. Frequent bleeding and vascular access site complications with this approach have led to the search for an alternate route. Transradial coronary angiography and intervention has become a popular technique due to reduced local and bleeding complications, easier post-procedural care and patient preference. In certain patients, transradial access may not be possible due to various anatomical reasons.

Transulnar arterial access however, has recently been shown to be feasible and safe for both coronary angiography and intervention. The procedural success, advantages and complication rates for this procedure appear similar to those for the transradial approach. The technical success rate is 95-96% through transulnar route. Complications such as local hematoma, ulnar artery perforation and reversible parasthesia can occur in 1% of patients.[1]

In many patients, when the transradial cannulation is not feasible due to anatomical aberration or any other difficulty, the transulnar approach may be tried.

Methods:

In the forearm, ulnar artery is larger in caliber than the radial artery[2]. The ulnar nerve lies on the medial side of lower two-third of the artery and the palmer cutaneous branch of nerve descends on lower part of vessel to the palm of the hand. It crosses the flexor retinaculum lateral to ulnar nerve and pisiform bone.

A study was done in the Department of Cardiology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, from March 2012 to August 2012. 15 consecutive patients were included for transulnar coronary angiography. The techniques described for ulnar cannulation and sheath placement are similar to those for radial artery access. In all cases, adequacy of radial collateralization to the hand was checked with the inverse Allen's test or a variation of this based on oxygen plethysmography. Typically, the arm was abducted to approximately 70 degrees with mild hyperextension of the wrist. Local anesthetic is infiltrated in the region just proximal and lateral to the pisiform bone. The Seldinger technique was used to cannulate the vessel. Sheaths between 5 Fr and 6Fr diameter and 11 cm length were used. Coronary angiographies were performed via 5 Fr catheters. We have used intra-arterial glycerine trinitrate (GTN) and verapamil to counter the ulnar artery spasm. Vascular sheath was removed immediately after the procedure and manual compression and pressure bandage was given in all cases. After 3-4 hours, pressure bandage was loosened and on the next day bandage was removed.

Results:

Out of 15, transulnar coronary angiography was done successfully in 14 (93.99%) patients, 1(6.66%) case was postponed due to failure to canulate the ulnar artery. Of them 11(64.28%) was male and 3(21.42%) was female. 2 (14.28%) of them had significant ulnar artery spasm, for which we had to use higher dose (300 micro gram) of GTN

through the sheath. Total procedural time from vascular access to sheath removal was 16.41±1.3 minutes. Total fluoroscopy time was 3.6±1.2 minutes. None of the patient had significant pain, swelling and access site bleeding.

Several small, single centre case series that demonstrated the feasibility and safety of transulnar angiography and PCI have since been published.[4,5,7] One randomized study has compared the transulnar and transradial approaches (PCVI-CUBA study).[8]

In PCVI-CUBA study successful access was obtained in 93.1% of patients in the ulnar group (n = 216), and in 95.5% of patients in the radial group (n = 215), (where as in our study successful access was obtained in 93.99% which is very similar to that study). One hundred and three and 105 angioplasty procedures were performed in 94 and 95 patients in ulnar and radial group, with success in 95.2% and 96.2% of procedures in ulnar and radial group, respectively . Freedom from MACE at 1-month follow-up was observed in 93 patients in both groups (97.8% for ulnar group and 95.8% for radial group). Asymptomatic access site artery occlusion occurred in 5.7% of patients after transulnar and in 4.7% of patients after transradial angioplasty. A big forearm hematoma, and a little A-V fistula were observed, each in one patient, in the ulnar group. In Rath et al study[5] in 2004 (n =100) procedure success rate was (95%). Complications such as local hematoma, ulnar artery perforation, and reversible parasthesia occurred in one patient each.

Discussion:

Trans femoral route for coronary angiography and angioplasty is still the preferred approach among interventional cardiologist; the reason being its large caliber and operator experience. This approach carries with it the inherent risk of complications like pseudo aneurysm, arteriovenous fistula retroperitoneal bleed etc. Kiemeneij et al.[1] compared PCI from various routes and found 2% incidence of major bleeding via femoral route. To overcome these complications transradial approach started gaining popularity. Radial access is unsuitable for a significant number of patients due to an abnormal Allen's test, a small calibre artery and other anatomic anomalies.[10] Previous data has shown that up to 27% of patients have a negative Allen's test,[3] precluding the safe use of the transradial route. Furthermore, nearly 10% of patients in a Japanese study had anatomic variations such as excessive tortuosity, radio-ulnar loops, stenoses and hypoplasias, although transradial PCI was successfully performed in 97% of the cohort.[2]

Recently a few studies have reported the feasibility of performing coronary angiography and angioplasty using ulnar artery approach. In Rath et al study [5] in 2004 (n =100) procedure success rate was (95%). Complications such as local hematoma, ulnar artery perforation, and reversible parasthesia occurred in 1% each. In PCVI-CUBA[8] study comparing the transulnar and transradial approaches has shown that both approaches had high rates of technical success (95.2% transulnar vs. 96.2% transradial) and a low incidence of local haematomas (5.7% transulnar vs. 8.1% transradial), without significant differences in either route.[8] No patient required a blood transfusion or vascular surgery, and none had symptoms or signs of hand ischemia.[8]. Post procedure asymptomatic ulnar artery occlusion occurs in 5% of patients.

The transulnar approach may therefore be an attractive alternative entry site in patients with unsuitable radial access, since it appears to share the same benefits as the transradial route, with no major disadvantages. This is particularly so if transfemoral access is also associated with an elevated risk of local complications, or if it is not possible due to severe peripheral arterial disease. An additional advantage in using the transulnar approach is that it can preserve the future use of the radial artery as a conduit for coronary artery bypass surgery. The reversed Allen's test is much more likely to be normal compared to the standard Allen's test, since the deep palmer arch (supplied by the radial artery) is complete in 95% of the patients[8] . The ulnar artery is usually larger than the radial artery, this make it less spasm-prone and easily accessible with fewer complications.

Due to the proximity of the ulnar nerve, which runs along the medial border of the ulnar artery, there is a risk of nerve injury during transulnar procedures. With a careful puncture using a fine gauge needle, permanent neuropraxia has not been observed, although a few patients have reported lightning-flash pain in the ulnar side of the hand.[7]. Due to its deeper location, access to the ulnar artery may be more challenging than the radial artery, and a learning curve has also been documented, even for experienced transradial operators.[7] The only instance in which transulnar access should not be attempted is when an unsuccessful attempt at radial cannulation has just been performed during the same procedure, risking the rare event of acute occlusion of both arteries.

Conclusion:

Use of ulnar artery in the current era of interventional cardiology opens another alternate route to heart and

coronary arteries. The procedural success, advantages and complication rates appear to be similar to those for the transradial approach. This approach also leads to sparing of the radial artery which can be used as a conduct in subsequent revascularization procedures.

Thus, transulnar approach is a safe and useful alternative approach for performing routine diagnostic and interventional coronary procedures.

References:

1. Kiemeneij F, Laarman GJ. Percutaneous transradial artery approach for coronary stent implantation. Cathet Cardiovasc Diagn 1993; 30:173-8.
2. Yokoyama N, Takeshita S, Ochiai M, et al. Anatomic variations of the radial artery. In patients undergoing transradial coronary intervention. Catheter Cardiovasc Interv 2000; 49:357-62.
3. Benit E, Vranckx P, Jaspers L, et al. Frequency of a positive modified Allen's test in 1,000 consecutive patients undergoing cardiac catheterisation. Cathet Cardiovasc Diagn 1996; 38:352-4.
4. Limbruno U, Rossini R, De Carlo M, et al. Percutaneous ulnar artery approach for Primary coronary angioplasty: safety and feasibility. Catheter Cardiovasc Interv 2004; 61:56-9.
5. Pratap c Rath, Bharat Purohit, Girish B Navasundi, Sitaram, A Mallikarjun Reddy; Coronary Angiogram and intervention through Transulnar Approach
6 Vogelzang Rl. Arteriography of the hand and wrist Hand Clin 1991;7;63-68
7. Aptecar E, Dupouy P, Chabane-Chaouch M, et al. Percutaneous transulnar artery Approach for diagnostic and therapeutic coronary intervention. J Invasive Cardiol 2005; 17:312-7.
8. Aptecar E, Pernes JM, Chabane-Chaouch M, et al. Transulnar versus transradial artery approach for coronary angioplasty: the PCVI-CUBA study. Catheter Cardiovasc Interv 2006; 67:711-20
9 Terashima M, Meguro T, Takeda H, et al. Percutaneous ulnar artery approach for coronary angiography: a preliminary report in nine patients. Catheter Cardiovasc Interv 2001; 53:410-4.
10. Valsecchi O, Vassileva A, Musumeci G, et al. Failure of transradial approach during coronary interventions: anatomic considerations. Catheter Cardiovasc Interv 2006; 67:870-8.