

## A Comparison Of Radial Versus Femoral Approach In Primary Percutaneous Coronary Interventions

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**Abstract:** Most interventional cardiologists choose the femoral route for non-compulsory and number one PCI (PCI). Transradial access is gaining popularity due to less issues at the entrance location. 100 patients with acute ST-phase elevation myocardial infarction were recruited in the study. The researcher divided the study population in 1/2, assigning 1/2 of Group A to patients whose first PCI was performed using the transfemoral route and 1/2 of Group B to transradial route patients. Comparing groups' problems. Major and small hematomas, bleeding difficulties, pseudoaneurysm of the femoral artery, and lack of radial artery have been visible in each group, even though the distinction become now no longer statistically significant. First, primary angioplasty may be performed transfemoral or transradial; second, there is no difference in complication rates between the femoral and radial techniques for patients with acute myocardial infarction undergoing first PCI; and third, the operator must utilise the method that is learned.

**Key Words:** Myocardial Infarction, Radial Access, Percutaneous Coronary Procedures, and Coronary Angiography

### Introduction

For PCIs, the Seldinger procedure is used to get percutaneous access to the arteries via the femoral, brachial, or radial artery. The femoral artery has been the go-to for PCI access for the past three decades because it is big and can accept the larger catheters required for more complicated operations like bifurcation and chronic complete blockage (Gargiulo, G., et.al (2022). Even more so when glycoprotein IIa/IIIa inhibitors are used in primary PCI procedures, bleeding at the access site is a typical consequence. Due to its advantages

(lower risk of problems at the incision site, quicker recovery time, less time spent in the hospital), radial access has been increasingly common in recent years (Senguttuvan, N. B., Reddy, P. M., et.al (2022). The lengthy learning curve and the inability to execute some difficult procedures that may need using larger catheters are two of the key reasons why many operators are still hesitant to use the radial artery access. The radial technique has fewer difficulties at the access site than other methods do because it is more convenient to compress, facilitating hemostasis. Radial access, on

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the other hand, is more likely to result in arterial occlusion after the procedure than femoral access (Mori, H., Sakurai, K., et. al [2022](#); Savage, M., Hay, K., et. al [2022](#)). Transradial access is always the first choice among patients because of its ease of usage. Unfortunately, PCI operators face a steep learning curve before they can effectively use transradial access. It's possible that the radial method would rule out the use of some quite large devices, including temporary pacemakers or intra-aortic balloon pumps, both of which are commonly utilised in interventions (Choi, S. H., Park, S. D., et. al [2022](#); Sattar, Y., Talib, U., et. al [2022](#)). In light of the foregoing, we set out to examine whether radial or femoral access is preferable for primary angioplasty in cases of acute ST-elevation myocardial infarction.

## **Material and Methods**

One hundred sufferers with ST-elevation myocardial infarction supplied to our clinic, Hayatabad Medical Complex Peshawar, among January 1 to December 31, 2017 have been protected in our observe. Group A protected 50 sufferers whose number one PCI changed into executed through the femoral artery, and organization B protected the identical variety of sufferers whose foremost PCI changed into executed through the radial artery. Ethical approval changed into received from the Hospital's Ethical Committee. However, previous to the behavior of observe, all sufferers gave written knowledgeable permission earlier than surgery, as consistent with clinic policy.

Diabetes mellitus, excessive blood pressure, excessive cholesterol, a smoking records, and a private or own circle of relatives records of coronary artery disease (CAD) have been studied as ability threat factors. Taking a affected person's blood pressure, taking note of their coronary heart for any uncommon sounds or murmurs, and taking note of their lower back for rales are all vital elements of a complete medical exam that results in the willpower of electrocardiogram (ECG), troponin, and cardiac enzymes. Routine coronary angiography strategies have been used. The coronary arteries have been studied in lots of

distinct perspectives. The records changed into separated into sets: number one coronary arteries and their branches. The left foremost, left anterior descending, circumflex, and proper coronary arteries have been taken into consideration with foremost subsidiary branches such the diagonal, obtuse marginal, and posterior descending arteries. Primary percutaneous coronary intervention (PCI) of the tricky artery changed into executed on observe participants. Prior to surgery, a bolus of unfractionated heparin at a dosage of 70 IU/kg changed into administered. To utilise extra antithrombotic drugs, together with glycoprotein IIb/IIIa inhibitors, thrombus aspiration, or balloon redilation, changed into a medical choice left to the discretion of the operator. Glycoprotein IIb/IIIa inhibitor boluses have been given as needed, accompanied with the aid of using a non-stop infusion over the direction of 24 hours.

Patients have been given acetylsalicylic acid and both a hundred and eighty mg of Ticagrelor or six hundred mg of Clopidogrel previous to stent implantation, with the latter organization additionally receiving HMG CoA reductase inhibitors and twin antiplatelet therapy (both a hundred mg of Aspirin as soon as every day with ninety mg of Ticagrelor two times every day, or a hundred mg of Aspirin as soon as every day with 75mg of Clopidogrel as soon as every day).

Before starting surgery, the medical doctor checked the affected person's radial and femoral pulses. Group A sufferers had transfemoral operations. After the affected person changed into given lidocaine for anaesthesia, a 6F sheath changed into threaded over a 0.035" guidewire the use of the Seldinger method (2 percent). People in Group B had a transradial method taken. Lidocaine (2%) changed into used for neighborhood anaesthesia earlier than a 19-gauge needle changed into inserted into the radial artery to cannulate it. Initially, a 0.022" guidewire changed into inserted, after which a 6F radial sheath changed into positioned over it. Five milligrams of verapamil and fifty milligrams of nitroglycerin have been hired as a vasodilator. By applying external compression using the TR band, we were able to stop the bleeding. Unless

otherwise indicated by their clinical status, participants in the transradial group were permitted to walk immediately after intervention, whereas those in the transfemoral group were permitted to do so after 12 hours. Each fluoroscopic checkup, surgical procedure, and patient access was timed and recorded. In order to detect the onset of access site difficulties, clinical tests were done on patients immediately after surgery, before to release from our hospital's Cardiac Care Unit (CCU), and again 2 weeks later.

An IBM-like minded non-public pc jogging the statistical software program SPSS turned into used to collect and examine the facts. The facts turned into analysed the usage of the perfect statistical methods, which includes means, trendy deviations, and the Student`s t test. In this study, a P price of much less than 0.05 turned into taken into consideration significant, even as a P price of much less than 0.001 turned into taken into consideration to be very significant.

## Results

Examining 100 those who had had an ST-phase expanded myocardial infarction (STEMI). Fifty sufferers in Group A had number one percutaneous coronary intervention (PCI) through the femoral artery; 22 of those sufferers had hypertension, 18 had diabetes, 15 had a record of smoking, 17 had excessive cholesterol, and eleven had a fine own circle of relatives records of coronary artery disease.

In Group B, 50 sufferers, 12 with a fine own circle of relatives records of coronary artery disease, 24 with hypertension, 17 with diabetes, 17 with smoking, and 17 with excessive cholesterol, all had transradial PCI as their number one therapy.

The baseline records in [Table 1] display that there are vast variations among the 2 agencies with appreciate to hypertension, diabetes mellitus, cigarette smoking, hyperlipidemia, and a fine own circle of relatives records of coronary artery disease.

**Table 1.** The distribution of risk factors among Group A and Group B

Item	Group A	Group B	P
HTN	22	24	0.231
DM	18	17	0.339
Somkers	15	17	0.229
Hyperlipidemia	17	17	0.411
Positive family history	11	12	0.239

Group A: Of the 27 patients in Group A, 3 had normal coronary arteries, 14 had double-vessel disease, and 7 had multiple-vessel disease.

Patients in Group B ranged from those with healthy coronary arteries (group A) through those with several impacted vessels (group C) to those

with just one damaged artery (group B).

Based on the angiographic characteristics and severity of coronary artery disease of the patients in the study, which were previously presented in [Table 2], we did not find a statistically significant difference between the two groups.

**Table 2.** Angiographic characteristics among group A and group B Patients in Group A had a mean access time of 5.4 minutes, a mean fluoroscopy time of 6.1 minutes, and a mean procedural time of 28.9 minutes.

Item	Group A	Group B	P
Normal coronaries	3	4	0.311
One-vessel disease	26	24	0.219
Two-vessel disease	14	15	0.323

Item	Group A	Group B	P
Multivessel disease	7	7	0.411

Access took an average of 5.6 minutes, fluoroscopy averaged 6.3 minutes, and the procedure took 28.5 minutes on average for patients in Group B. We found statistically insignificant difference between the two groups in

terms of the mean access time, the mean fluoroscopy time, or the mean procedural time, as shown in the previous data presented in [Table 3] on studying the procedural parameters in the study.

**Table 3.** Procedures in both groups were compared to one another.

Item	Group A	Group B	P
Access time (min)	5.4	5.6	0.311
Fluoroscopy time (min)	6.1	6.3	0.319
Procedural time (min)	28.9	28.5	0.411

Two patients in Group A had large hematomas, four others developed smaller ones, six others had bleeding issues, and one developed a pseudoaneurysm.

Four patients in Group B had bleeding difficulties, including one with radial artery blockage, and one patient in Group B had a major haemorrhage.

**Table 4.** Major and minor hematomas, bleeding problems, femoral artery pseudoaneurysm, and radial artery loss occurred similarly in both groups

Item	Group A	Group B	P
Major hematoma	2	1	0.211
Minor hematoma	4	3	0.221
Bleeding complications	6	4	0.129
Pseudoaneurysm	1	0	0.061
Loss of radial artery	0	1	0.061

## Discussion

We determined no statistically big distinction among the transfemoral (organization A) and transradial (organization B) agencies, that's consistent with the findings of Bhat et al., (2017) Romagnoli et al., and Tewari et al who all mentioned a comparable distribution of sufferers via way of means of chance elements of their investigations. Kumar et al who as compared the transradial to the transfemoral method in sufferers with acute STEMI, discovered comparable outcomes (Bhat FA, Chngal KH, Raina H, et al. (2017).

Consistent with preceding research, we determined no big distinction in angiographic functions or CAD severity among the transfemoral

(organization A) and transradial (organization B) agencies while evaluating the transfemoral and transradial routes for acute STEMI.

We determined no statistically big distinction withinside the imply get admission to time, imply fluoroscopy time, or imply system time among the transfemoral (organization A) and transradial (organization B) agencies. Whereas Bhat et al (2017) results held up, ours did not. Transradial strategies have been mentioned to have an extended get admission to time (6.0 1.8t min vs. 4.2 zero.70 min, P 0.0001). Time to crowning glory turned into extra for the transradial organization than the transfemoral organization (29.11 3 vs. 27.3.12.4 minutes, P = 0.03). Both the transfemoral and transradial procedures wished

nearly the equal quantity of overall fluoroscopic time (6.4 2.9 vs 6.0 2.5 min,  $P = 0.015$ ) (Kumar R, Kumar K, Kane G, *et al.* (n.d). In addition, our effects diverged from the ones of Kassam *et al.* Kiemeneij and Laarman discovered (Naini, P. T., Jamalain, M., *et al.* [2022](#)) that procedure time and time spent the usage of the fluoroscopic photo have been comparable. Transfemoral PCI turned into extra powerful even withinside the maximum modern statistics from the United States National Cardiovascular Data Registry. We found that the radial method turned into related to a reduced occurrence of nearby vascular issues, that's consistent with the effects of the RIVAL study, which indicated that each the radial and femoral procedures to PCI have been secure and powerful.

The most common adverse effects were hematomas and bleeding disorders. Transfemoral patients had a slightly higher incidence of complications than those in Group B. (transradial). Our results are at odds with those of Bhat *et al.* ([2017](#)) and Romagnoli *et al.* who both found a much higher frequency of issues in the transfemoral group than in the transradial group. De Caterina, R., Agewall, S., [2022](#)) found that although 7.4% of the transfemoral group and 0% of the transradial group suffered bleeding at the access site, respectively ( $P = 0.04$ ). In contrast to our results, Agostoni *et al.* (Ueki, Y., Zanchin, T., [2022](#)) found that the transradial group was associated with a much-reduced risk of complication, although at

the expense of greater operation failure. This gap is likely attributable to the fact that the femoral route is the favored route at the National Heart Institute in Egypt, where operators are more likely to have expertise with the transfemoral route than the transradial approach. ST-elevation acute coronary syndrome individuals who have bleeding at the puncture site have a much higher risk of dying from their condition. Because of the link between bleeding, ischemic events, and mortality, it is important to prevent iatrogenic hemorrhagic effects (Gladden, J. D., Gulati, R., & Sandoval, Y. ([2022](#)).

However, these ratings are generally not as useful in situations of acute myocardial infarction, when primary PCI is performed as quickly as possible to reduce the ischemia period and save the myocardium (TORKEY, E. M., MOHAMED, I. S., [2022](#)) Multiple risk ratings exist now to approximate a patient's potential for bleeding.

## Conclusion

Based on the findings above, one might conclude:

1. Primary angioplasty can be performed by either the transfemoral or transradial routes.
2. In primary PCI for STEMI, the transfemoral versus transradial technique makes no discernible difference.
3. The operator is free to employ whatever method best suits their needs.

## References

- Bhat FA, Chahal KH, Raina H, *et al.* (2017). Transradial versus transfemoral approach for coronary angiography and angioplasty—a prospective, randomized comparison. *BMC Cardiovasc Disord* 2017, 17:23. <https://doi.org/10.1186/s12872-016-0457-2>
- Bouchahda, N., Ben Abdesslem, M. A., Ben Hlima, N., Ben Messaoud, M., Denguir, H., Boussaada, M. M., Saoudi, W., Jamel, A., Hassine, M., Bouraoui, H., Mahjoub, M., Mahdhaoui, A., Jeridi, G., Betbout, F., & Gamra, H. (2023). Combination Therapy With Nicardipine and Isosorbide Dinitrate to Prevent Spasm in Transradial Percutaneous Coronary Intervention (from the NISTRA Multicenter Double-Blind Randomized Controlled Trial). *The American Journal of Cardiology*, 188, 89–94. <https://doi.org/10.1016/j.amjcard.2022.11.005>
- Choi, S. H., Park, S. D., Lee, M. J., & Lee, K. J. (2022). Comparison of trans-radial access and femoral access in cardiogenic shock patient who had undergone primary percutaneous coronary intervention from SMART RESCUE trial. *European Heart Journal*, 43(Supplement\_2), 3512-3527. <https://doi.org/10.1093/eurheartj/ehac544.1246>
- De Caterina, R., Agewall, S., Andreotti, F., Angiolillo, D. J., Bhatt, D. L., Byrne, R. A., & Galli, M. (2022). Great Debate: Triple antithrombotic therapy in patients with atrial fibrillation undergoing coronary stenting should be limited to 1 week. *European Heart Journal*, 43(37), 3512-3527. <https://doi.org/10.1093/eurheartj/ehac294>
- Gargiulo, G., Giacoppo, D., Jolly, S. S., Cairns, J., Le May, M., Bernat, I., Romagnoli, E., Rao, S. V., van Leeuwen, M. A., Mehta, S. R., Bertrand, O. F., Wells, G. A., Meijers, T. A., Siontis, G. C., Esposito, G., Windecker, S., Jüni, P., & Valgimigli, M. (2022). Effects on Mortality and Major Bleeding of Radial Versus Femoral Artery Access for Coronary Angiography or Percutaneous Coronary Intervention: Meta-Analysis of Individual Patient Data From 7 Multicenter Randomized Clinical Trials. *Circulation*, 146(18), 1329–1343. <https://doi.org/10.1161/circulationaha.122.061527>
- Gladden, J. D., Gulati, R., & Sandoval, Y. (2022). Contemporary Techniques for Femoral and Radial Arterial Access in the Cardiac Catheterization Laboratory. *Reviews in Cardiovascular Medicine*, 23(9), 316.
- Gwefel, A., Louis, O., & Yassin, I. (2022). Comparison of the Renal Function Using Two Different Approaches for Primary Percutaneous Coronary Intervention: A Retrospective Cohort Study. *Cardiol Vasc Res*, 6(4), 1-8.
- Hannan, E. L., Zhong, Y., Ling, F. S., LeMay, M., Jacobs, A. K., King, S. B., Berger, P. B., Venditti, F. J., Walford, G., & Tamis-Holland, J. (2022). Relation of Operator Volume and Access Site to Short-Term Mortality in Radial Versus Femoral Access for Primary Percutaneous Coronary Intervention. *The American Journal of Cardiology*, 176, 30–36. <https://doi.org/10.1016/j.amjcard.2022.04.025>
- Kumar, R., Kumar K, Kane G, *et al.* Comparative study of trans radial versus trans femoral route in acute STEMI. *IOSR Journal of Dental and Medical Sciences(IOSR-JDMS)* 2019, 18, 61–69.
- Mori, H., Sakurai, K., Ikari, Y., Fukui, K., Maeda, A., Akashi, Y., ... & Suzuki, H. (2022). Radial versus femoral access in patients undergoing primary percutaneous coronary intervention for ST-elevation myocardial infarction: A propensity-matched analysis from real-world data of the K-ACTIVE registry. *Journal of Cardiology*.
- Naini, P. T., Jamalian, M., Riahi, A., Roohafza, H. R., Shafiei, M., Agharazi, M., & Sadeghi, M. (2022). Long-term hospital readmission after ST-elevation myocardial infarction: A three-year follow-up from SEMI-CI study. *The Journal of Tehran University Heart Center*.
- Piątek, U., Piątek, K., Kurzawski, J., Sadowski, M., Malinowski, K., Cecha, P., Bartuś, S., &

- Siudak, Z. (2022). Predictors and periprocedural outcomes of access crossover during primary percutaneous coronary interventions — a contemporary report from the Polish ORPKI registry. *Kardiologia Polska*, 80(7–8), 799–805. <https://doi.org/10.33963/kp.a2022.0121>
- Piedimonte, G., Bertagnin, E., Castellana, C., Ferrarotto, L., Mangione, R., Venuti, G., Valvo, R., Scalia, M., Capodanno, D., Tamburino, C., & La Manna, A. (2022). Ultrasound- Versus Fluoroscopy-Guided Femoral Access for Percutaneous Coronary Intervention of Chronic Total Occlusions: Insights From FOUND BLOOD CTO Registry. *Cardiovascular Revascularization Medicine*, 38, 61–67. <https://doi.org/10.1016/j.carrev.2021.08.024>
- Saab, F., & Md, F. (2030). *TAMI: A New Technique in Critical Limb Ischemia Revascularization*.
- Sattar, Y., Talib, U., Faisaluddin, M., Song, D., Lak, H. M., Laghari, A., ... & Alam, M. (2022). Meta-analysis comparing distal radial versus traditional radial percutaneous coronary intervention or angiography. *The American Journal of Cardiology*, 170, 31–39.
- Savage, M., Hay, K., Murdoch, D., Walters, D. L., Denman, R., Ranasinghe, I., & Raffel, C. (2022). Sex differences in time to primary percutaneous coronary intervention and outcomes in patients presenting with ST-segment elevation myocardial infarction. *Catheterization and Cardiovascular Interventions*, 100(4), 520–529. <https://doi.org/10.1002/ccd.30357>
- Senguttuvan, N. B., Reddy, P. M., Shankar, P., Abdulkader, R. S., Yallanki, H. P., Kumar, A., & Bahl, V. K. (2022). Trans-radial approach versus trans-femoral approach in patients with acute coronary syndrome undergoing percutaneous coronary intervention: An updated meta-analysis of randomized controlled trials. *Plos one*, 17(4), e0266709. <https://doi.org/10.1371/journal.pone.0266709>
- Tokarek, T., Dziewierz, A., Plens, K., Rakowski, T., Januszek, R., Zabojszcz, M., Janion-Sadowska, A., Dudek, D., & Siudak, Z. (2022). Comparison of safety and effectiveness between the right and left radial artery approach in percutaneous coronary intervention. *Revista Española De Cardiología (English Edition)*, 75(2), 119–128. <https://doi.org/10.1016/j.rec.2020.09.019>
- TORKEY, E. M., MOHAMED, I. S., AMR, M., MOHAMMAD, A. S., ELWANY, M., & MOSTAFA, N. (2022). Radial versus Femoral Approach for STEMI Patients Undergoing Primary or Rescue PCI: Alexandria University Experience. *The Medical Journal of Cairo University*, 90(6), 1085–1091. <https://doi.org/10.21608/mjcu.2022.25.7379>
- Ueki, Y., Zanchin, T., Losdat, S., Karagiannis, A., Otsuka, T., Siontis, G. C. M., Häner, J., Stortecky, S., Pilgrim, T., Valgimigli, M., Windecker, S., & Räber, L. (2022). Self-reported non-adherence to P2Y12 inhibitors in patients undergoing percutaneous coronary intervention: Application of the medication non-adherence academic research consortium classification. *PLOS ONE*, 17(2), e0263180. <https://doi.org/10.1371/journal.pone.0263180>