

Original Article

Radial Vs Femoral Approach for Coronary Angiography. A Retrospective Study at Beirut General University Hospital from January to December 2014

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ABSTRACT

Objectives: This study was conducted to evaluate the differences in the procedural variables between transradial and transfemoral access for coronary angiography and to determine the efficacy and safety of the radial access comparing to femoral.

Subjects and Methods: This was a retrospective study of 210 radial and 189 femoral accesses, diagnostic and therapeutic cardiac catheterization procedures done on patients who were admitted to Beirut General University Hospital in 2014. Medical records of these patients were then analyzed, the reason for coronary intervention was noted for every patient, and the past medical history is reviewed. The course of stay in the hospital was analyzed by reviewing the progress notes to assess if the patient developed any complication or mortality during the period of hospitalization.

Results: The radial approach had significantly lesser access site complications 6.7% vs. 14.8% in the femoral approach with a p value of 0.009, and less MACE comparing to the femoral access (0.5% vs. 2.1% respectively) with a p value of 0.194. The one day admission is more seen in the radial approach 68.6% vs 43.9% in the femoral approach with significant p value ($p < 0.001$). The radial was the preferred access site because of lesser procedural time, length of stay and complications (related to MACE or access site)

Conclusion: Compared with femoral access, radial access reduced mortality and MACE and improved safety, with reduction in major bleeding and vascular complications.

Keywords: Cardiac catheterization, femoral access, radial access, bleeding, vascular complications.

1. INTRODUCTION:

1.1 General Presentation

The common femoral artery has long been the access site for doing coronary angiography and angioplasty (1). But recent technological advances have enabled the miniaturization of

diagnostic catheters as well as the equipment for percutaneous transluminal coronary angioplasty (2). Owing to this miniaturization, the percutaneous arm approach via the radial artery is becoming more popular throughout the world as an alternative to the femoral artery technique (3).

Several studies have been conducted throughout the world to compare the pros and cons of each procedure. The majority of those studies reached conclusion that clearly favor the radial approach in term of patient comfort, preference and access site complications and MACE.

In Lebanon, though, no recent studies have been conducted regards to this issue.

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1.2 Review of Literature

Femoral artery catheterization was the standard approach for coronary angiography in U.S. However, many studies have compared the femoral and radial approaches and reached conclusions that clearly favor the radial access. Complications are classified into two major categories: MACE and Access site complication.

In a study done on 503 consecutive patients, who underwent femoral artery catheterization, the complications were hematoma formation, rebleeding, limb ischemia, AV fistula, thrombosis of femoral artery, pseudo aneurysm or need for transfusion (4).

The negative drawbacks of femoral access have led the European authorities to shift to radial catheterization as better alternative (5). Some benefits of this approach include: less bleeding complications, lower morbidity and early ambulation.

Vorobcsuck et al found a 70 % risk reduction in access site bleeding with transradial approach and by consequence lower incidence of MACE(6).

Jeffrey et al (7) demonstrated that the benefits of transradial approach lie in its early ambulation and patient's satisfaction.

In contrast, spasm is commonly seen as complication of transradial approach. As a result of these advantages over femoral approach, transradial become popular access worldwide.

1.3 Objectives

This study intends as general objective to compare the femoral versus the radial approach to coronary angiography at BGUH over the period of one year from January 2014 to December 2014 and to statistically put them into a comparison. The procedure that would have less complication rates would be perceived by this study as the superior procedure.

2. METHODS

2.1 Study Design

This is a single center, retrospective observational study conducted in 399 Lebanese patients who underwent cardiac catheterization at BGUH via radial or femoral access at BGUH during 2014.

2.2 Data Collection

After obtaining the approval to access the medical records from the administration of BGUH, a total number of 800 patients who underwent cardiac catheterization were noted in 2014, with a total number of available medical records of 524.

Patients who fitted the inclusion criteria were then selected (399 patients). Medical records of these patients were then analyzed thoroughly.

2.3 Statistical Analysis

The data was analyzed using the statistical program SPSS (Statistical Package for the Social Sciences). Data were expressed as means \pm SD.

3. RESULTS

From 399 patients, 210 underwent coronary intervention via radial access (fig.1). In female patients, femoral access is more used (34.4%) vs radial (33.8%). However in male patients, the radial one is more used (66.2%) vs. femoral (65.6%). Although results are not statistically significant (p value 0.916).(fig.2)

However the femoral access is preferred in STEMI (7.9%) over radial access(3.8%) and the difference was statistically significant (p value<0.001)(fig.3)The time of procedure is less via radial approach (18.1min +/-7.8) compared to femoral (21.6+/-9) with a statistically significant p value (<0.001)(fig.4).The one day admission is more seen in the radial approach 68.6% vs.43.9% for the femoral approach with significant p value (<0.001).(fig.5)

We divided the complications into 2 categories: MACE and related to access site. The MACE was seen more in the femoral approach 2.1% vs. 0.5% for the radial with clinically significant difference(fig.6). The access site complications were more dominant in the femoral access (14.8%) compared to the radial one (6.7%) with a significant p value (0.009)(fig.7).The hematoma formation is commonly seen as complication to femoral site (5.3%) vs. (0.5%) with a significant difference (p value: 0.003). Pain was a complication also more seen in the femoral access (4.8%) compared to radial (1.4%). Spasm is seen exclusively in radial approach (1.4%) with a significant p value (0.0003).

4. DISCUSSION

Radial access reduced the odds of major bleeding by 73% in patients undergoing coronary angiography or intervention compared to femoral access. There was a trend toward reduction in the composite of death, MI or stroke comparing radial vs. femoral access. The point estimate suggests a possible clinically relevant 30 % reduction in cardiovascular events, emphasizing the need for adequately powered randomized trials.

In our study, we found that more than half of the patients underwent coronary angiography via radial access. This was expected, as the trend toward transforming the radial approach into standard one.

A systematic review of the literature involving 2808 STEMI patients who were largely recruited via non-randomized comparisons, showed that transradial intervention was

associated with a significant, almost 50% decrease of overall mortality. Mortality in the 516 patients in whom access sites were randomly allocated was also numerically almost 40% lower in the transradial group, but this difference failed to reach statistical significance (8).

In the RIVAL (radial vs. femoral access for coronary intervention) study, patients randomized to the transradial arm in the highest tertile for radial percutaneous coronary intervention (PCI) center volume showed a 50% reduction of death, myocardial infarction, or stroke compared with the transfemoral group, which came along with a 55% reduction of major bleeding complications.(9)

A study by Marco Valgimigli et al suggests that the risks of transitioning toward the transradial route over the conventional transfemoral approach in STEMI patients, provided the process is undertaken in a step-wise approach as part of a global transradial intervention program, may be largely outweighed by a lower mortality rate(10).

The RIFLE-STEACS (Radial Versus Femoral Randomized Investigation in ST-Elevation Acute Coronary Syndrome) was a multicenter, randomized, parallel-group study(8)Between January 2009 and July 2011, 1001 acute ST-segment elevation acute coronary syndrome patients undergoing primary/rescue PCI were randomized to the radial (500) or femoral (501) approach at 4 high-volume centers. This study concluded that radial access in patients with ST-segment elevation acute coronary syndrome is associated with significant clinical benefits, in terms of both lower morbidity and cardiac mortality. Thus, it should become the recommended approach in these patients, provided adequate operator and center expertise is present.

Concerning the time of procedure, the major of the studies (table 1) showed that the radial approach is more time consuming than the femoral one .But in our study, the mean procedural time via the radial approach is 18.1 min vs.21.6 min for the femoral ,so this difference can be attributed to the time-in ; in our study ,the procedural time is recorded after the cannulation of the artery, but in other studies ,the cannulation time is included in the procedure.

5. CONCLUSION

Transradial approach to cardiac catheterization has been shown to significantly reduce access site bleeding and vascular complications compared with the traditional transfemoral approach, and may also reduce mortality among patients with STEMI undergoing PCI.

These advantages have translated into reduced length of stay, lower costs and increased patient preference for TRA.

There was an exponential growth in the use of transradial procedures over the last two decades. However, with increasing experience many new approaches are now

becoming available to overcome these potential challenges to transradial coronary procedure.

Finally, after this study, several steps should be taken in consideration. The first step would be to recommend the use of radial access on local and national levels. Further steps would be cooperation with colleagues from all over the world to conduct larger maybe multi-national studies that would change the authorities recommended procedure to the radial procedure. Thus, the future studies will broaden our knowledge about the further possible benefits and complications of both the approaches.

6. FIGURES

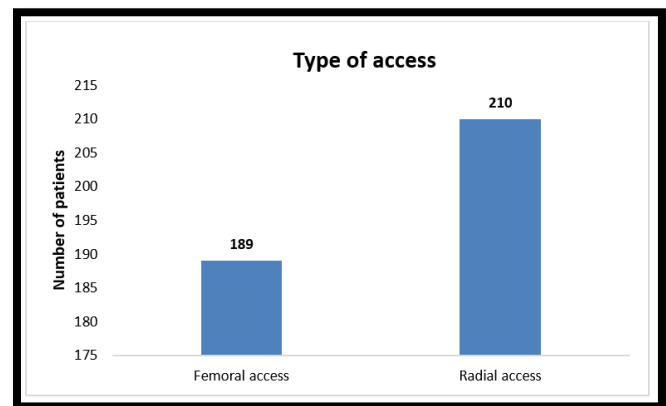


Fig 1: Type of access

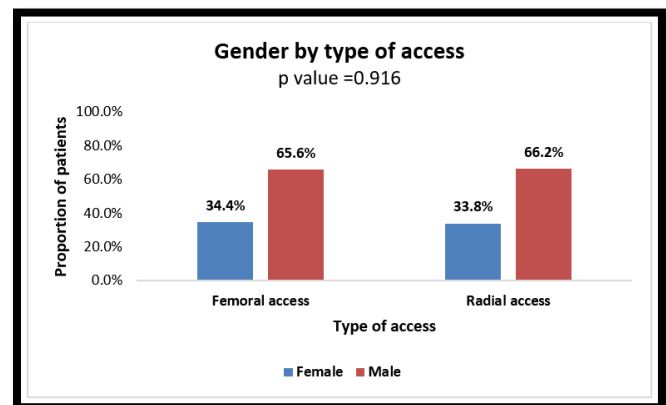


Fig 2: Gender by type of access

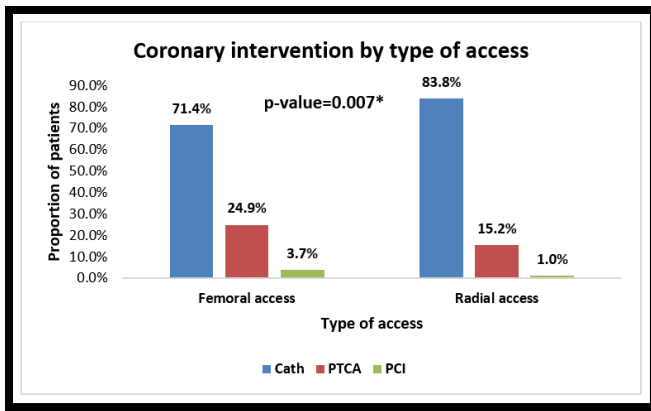


Fig 3: Coronary intervention by type of access

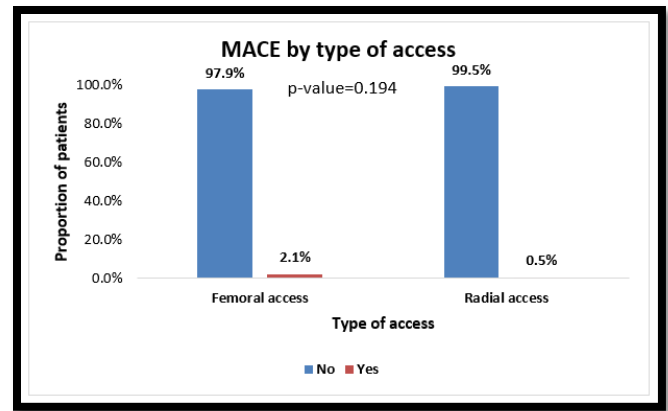


Fig 6: MACE by type of access

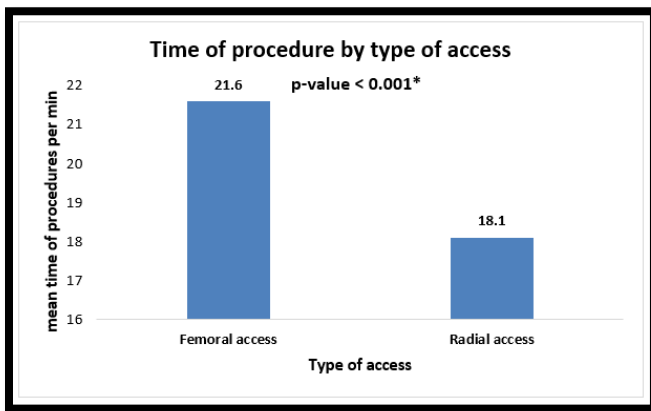


Fig 4: Time of procedure by type of access

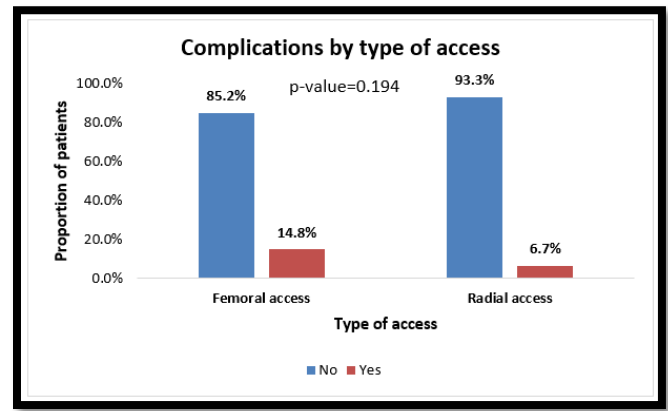


Fig 7: Complications by type of access

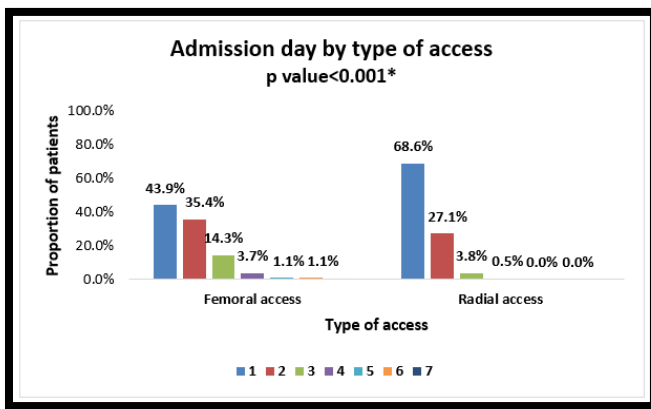


Fig 5: Admission day by type of access

7. TABLES

Table 1: Comparison between our study and others

	Other Studies	Our Study
Length Of Stay	Mann Et Al, 2.6DAYS Tf Vs 2.1 Days Tr P Value<0.04	1.84 Days Tf Vs 1.51 Days Tr P Value < 0.01
Procedural Time	Sallam Et Al 20.1MIN Tf Vs 23.7 Min Tr P Value :0.001	21.6MIN Tf Vs 18.1MIN Tr P Value <0.01
Procedure Failure	Ferdinand Et Al 0.3 %Tf Vs 7% Tr P Value:0.035	0.0% Tf Vs 0.5% Tr P Value :0.003
Bleeding	Hibbert B, Et Al. (564 Pts) 7.5% Tf Vs 2.0%Tr P Value = 0.029	5.3% Tf Vs 0.5%Tr P Value :0.003

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