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Comparison of Puncture Outcome between Needle versus Cannula over needle Technique for Radial Artery Cannulation during Distal Transradial Coronary Interventions

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Abstract

Background: Radial artery access by distal transradial approach (dTRA) is obtained using either Needle technique or Cannula over Needle technique. In Needle technique only anterior wall of radial artery is punctured (modified seldinger technique), whereas, both anterior and posterior wall are punctured with Cannula over needle (Seldinger technique). There is no previous comparative evaluation of the safety and feasibility of these two techniques in dTRA.

Methods: One hundred twenty patients undergoing distal transradial catheterization were randomized to group I (n=60) Needle technique, and group II (n=60) Cannula over needle technique. Demographic and procedural data were collected at the time of the procedure. Patient was observed for any complication after procedure and a duplex USG of radial artery done at 24hr after procedure to detect RAO.

Results: Age, gender, weight, height, history of diabetes mellitus, hypertension, dyslipidemia and smoking were comparable between groups I and II. Access time (4.7 ± 2.1 vs 4.3 ± 2.1 min, p=0.046), number of attempts to get access (1.75 ± 0.8 vs 1.45 ± 0.68, p=0.025), were significantly different favoring group II. Access was obtained at first attempt in 45% of patients in group I compared with 65% in group II ($P < 0.001$). Change in access site (crossover) was required in 10% of group II patients, compared with 20% crossover in group I ($P < 0.0001$). Incidence of hematoma (10% vs. 6.7%, $P > 0.2$), RAS (11.7% vs 8.3%, $P>0.5$) and RAO (10% vs 5%, $P > 0.4$) was comparable between groups I and II and not statistically significant.

Conclusion: Cannula over needle technique was superior than Needle technique in term of efficacy but complication rate was comparable in dTRA.

Keywords: Distal radial approach; Seldinger technique; Modified Seldinger technique

Introduction

Transradial access (TRA) has been considered as the default choice in cardiac catheterization because of the decreased access site complications, increased patient comfort, early mobilization [1]. Transradial coronary intervention is associated not only with reduced risks of bleeding and vascular access site complications but also with lower mortality as compared

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to transfemoral intervention. These benefits were found to be consistent across all patient subsets, including stable patients and patients presenting with acute coronary syndrome [2]. Distal transradial approach (dTRA) is most recently introduced mode of cardiac catheterization worldwide. It seems to be attractive for its safety profile and fewer complication like radial artery occlusion (RAO) and radial artery spasm (RAS) [3]. In 1989, Campeau first used the percutaneous transradial approach (TRA) for coronary angiography. Coronary angioplasty procedures via TRA and demonstrated that it was feasible and safe in addition to providing increased comfort and allowing earlier discharge. First described their experience with retrograde recanalization of the occluded radial artery via distal transradial approach (dTRA) [4]. Shared the experience of 70 selected patients out of 118 patients who underwent cardiac catheterization via the left distal radial artery (DRA) at the anatomic snuffbox (AS) in EuroIntervention [5]. In 2009, Europe performed 719094 percutaneous coronary intervention (PCI) procedures with 47% using the TR approach and in 2013, UK performed 71.2% of their PCIs via the radial artery [6]. In recent advancement of interventional cardiology, distal transradial approach(dTRA) is an promising alternative of conventional approach in terms of safety and efficacy. A study conducted in NICVD, Dhaka showed Distal transradial approach (dTRA) is most recently introduced approach of radial access in world which seems to be attractive for its safety profile and fewer complication like radial artery occlusion (RAO) and radial artery spasm (RAS) [3]. dTRA is associated with quicker hemostasis reduced incidence of RAS RAO [5,7]. Distal transradial access in the anatomical snuffbox has advantages over standard proximal access in terms of patient and operator comfort levels and risk of ischemia [8]. Accessing the radial artery is the basic necessary step in performing transradial catheterization. There are two different ways to perform radial artery cannulation: cannulation with a Needle (modified Seldinger technique) and with a Cannula over needle/Venflon (Seldinger technique). These methods are both widely adopted and there are radial access kits available in the market for both techniques.Seldinger technique is the original technique described for percutaneous access [9]. This involved a through and through puncture of the artery with subsequent withdrawal into the true lumen, followed by guidewire placement. In subsequent years, due to apparent drawbacks of posterior wall puncture in large arteries (like femoral artery)modified Seldinger technique, where the operator avoids posterior wall penetration, became popular.In Modified Seldinger technique, usually a radial access needle is used to puncture anterior wall of radial artery and as soon as it is in the lumen of the radial artery, a guidewire is inserted into it. Over the guidewire then 6-Fr hydrophilic sheath is introduced. Only anterior wall puncture is expected to cause fewer complications like hematoma and faster cannulation. These two studies showed different results. Moreover, there is limited data regarding comparison between these to access technique in our population. Both the studies were conducted using conventional radial access. There is no study available to compare these two techniques in dTRA. As dTRA is commonly practiced worldwide, a safe and feasible way of distal radial access is desired for best outcome. This study will help radial interventionists to select efficient and safe method of distal radial cannulation.

Materials and Methods

Study Design: Cross sectional observational study.

Place of Study: This study was carried out in the Department of Cardiology at National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh.

Study Period: July 2020- June 2021.

Study Population: Patients admitted in NICVD undergoing coronary interventions (CAG/PCI) by dTRA.

Sampling method: The sample was collected by purposive sampling method.

Sample size: So, we took 60 samples for each group.

Enrollment of subjects

Inclusion criteria:

- Patients admitted undergoing coronary interventions (CAG or PCI) through distal transradial approach (dTRA) was included.

Exclusion criteria:

- An absent radial pulse
- Severe vasospastic condition (such as Raynaud's)
- End stage renal disease patients having arterio-venous fistula or planning for making arterio-venous fistula.
- Vascular access sheath size more than 6-Fr.
- Patient with acute heart failure, congestive cardiac failure, cardiogenic shock.

Study procedure: Patients admitted in the Department of Cardiology, NICVD, Dhaka with IHD who fulfill the inclusion and exclusion criteria was considered for the study. Patient was evaluated by history, physical examinations and routine investigations for coronary investigations.The eligible patients were explained about the study and were participated in the study after getting an informed consent.Studied sample were randomized to either Needle group (Group I) and Cannula over needle group (Group II). Randomization was done by closed enveloped technique and 60 cases were collected for each group.Equal number of CAG(n=60) and PCI(n=60) was taken in both groups.Right distal radial artery was palpated to confirm vessel patency and feasibility for dTRA.Right arm-rest was provided with a table, and hand was kept in a position where distal radial artery is easily palpated. The hand was prepared in a sterile fashion and the draped positioned.

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Needle Technique: After sterile preparation, 2 ml of 1% lidocaine was infiltrated above anatomical snuffbox and a 21-gauge needle was used to puncture the anterior wall of the radial artery in anatomical snuffbox. A vasodilator cocktail was administered that consisted of 2.5 mg of Verapamil and 200 mcg of Nitroglycerin, intra-arterially via the introducer sheath. Fifty units per kilogram or sometimes 5000-unit unfractionated heparin was administered intravenously during CAG after placement of the introducer sheath. An adjunct bolus of 10000U unfractionated heparin was given during PCI if needed in order to achieve an activated clotting time of (ACT) 250-300sec.

Cannula over needle technique: After a similar preparation and local anesthetic infiltration as described in anterior puncture technique, a 21- gauge Cannula over needle(venflon) was used to obtain access in distal radial artery in anatomical snuffbox. Skin was entered at 45° angle and after entering the anterior wall of the radial artery; a flash of blood was seen in the transparent hub of the venflon. At this point, the venflon was advanced further and the posterior wall was punctured. The stylet was removed and a 0.021-inch guidewire was placed in the hub of the venflon cannula and the entire system was very gradually withdrawn. When pulsatile flow was seen in the hub of the venflon, the guidewire was advanced and over the guidewire, a 5-Fr or 6-Fr introducer sheath was inserted into the radial artery during CAG and PCI respectively. A vasodilator cocktail was administered that consisted of 2.5 mg of verapamil and 200 micrograms of Nitroglycerin, intra-arterially via the introducer sheath. Fifty units per kilogram/5000U unfractionated heparin was administered intravenously in CAG after introducer sheath placement. An adjunct bolus of 10000U unfractionated heparin was given during PCI if needed in order to achieve an activated clotting time of (ACT) 250-300sec.

Compression Technique: After the procedure, radial artery sheath was removed immediately and haemostasis was achieved by conventional hemostatic method with rolled gauge and leucoband. Total hemostatic compression time was noted. The compression was released after satisfactory access site haemostasis.

Data collection: Data was collected and compiled duly in a pre-designed data collection sheet for statistical analysis and interpretation

Statistical Methods: Data was processed and analyzed manually and using SPSS (Statistical Package for Social Sciences) Version 24.0.Quantitative data was expressed as mean and standard deviationQualitative data was expressed as frequency and percentage and comparison was carried by chi-square ($\chi 2$) test or student's t-test where appropriate. Differences in continuous variables between two groups were determined by independent student t-test. A probability (p) value of <0.05 was considered as significant, but p >0.05 is considered as insignificant.

Results

The study was carried out at the department of Cardiology, National Institute of Cardiovascular Diseases, Dhaka, Bangladesh, from July 2020 to June 2021. Clinical characteristics, biochemical tests, vascular complications such as hematoma, radial artery spasm, radial artery occlusion and efficacy was measured in 120 patients.

Table 1: Comparison of the study groups according to their age.

Age (in years)	Total (n=120)		Group-I (n=60)		Group-II (n=60)		P value
	n	%	n	%	n	%	
≤40	18	15	9	15	9	15	
41-50	27	22.5	12	20	15	25	
51-60	66	55	36	60	30	50	
61-70	9	7.5	3	5	6	10	
Mean ± SD	51.63 ± 8.46		51.55 ± 9.21		51.7 ± 7.7		0.923ns

Group I- Needle group, Group II – Cannula over needle group, Independent sample t test ns – non-significant

Table 1 showed comparison of study group according to age distribution. Highest frequency was 51-60 years age, 36 and 30 in group I and group II, respectively and that is followed by 41- 50 years age. Mean ± SD of group I and group II was 51.55 ± 9.21 years and 51.7 ± 7.7 years, but this difference was not statistically significant (p=0.923) (Figure 1).

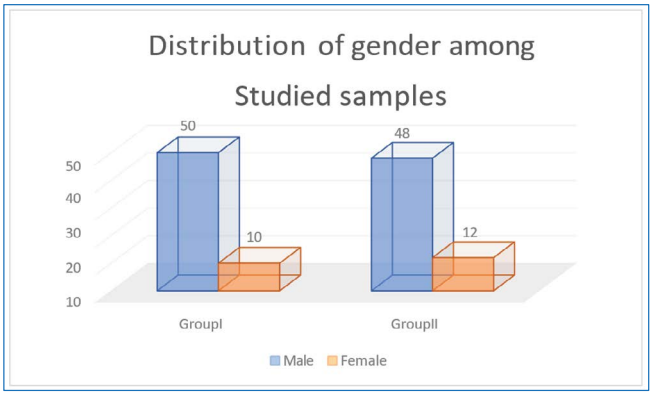

Figure 1: Distribution of gender among studied samples.

Table 2: Comparison of Weight, Height, BMI, RBS, HCT, Platelet count and S. creatinine.

	Total (n=120)	Group I(n=60)	Group II(n=60)	p-value
Weight (Kg)	68.9 ±9.3	69.9 ± 8.4	67.9 ± 10.2	0.243ns
Height (cm)	168.7 ± 4.1	169.3 ± 2.9	168.1 ± 4.9	0.093ns
BMI (kg/m2)	26.2 ± 2.7	26.4 ± 2.9	25.6 ± 2.6	0.510ns
RBS (mg/dl)	9.9 ±3.4	10.2 ± 3.5	9.6 ± 3.4	0.306ns
HCT (%)	40.2 ±1.7	40.4 ± 1.9	40.1 ± 1.5	0.266 ns
Platelet count (×103 /mm3)	270.9 ± 74.7	271.7 ± 74.4	270.2 ± 75.6	0.908 ns
S. creatinine (mg/dl)	1.2 ± 0.16	1.2 ± 0.15	1.2 ± 0.18	0.871 ns

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Table 2 showed mean ± SD of weight was 68.9 ±9.3 kg in studied samples, in group I it was 69.9 ± 8.4 kg and in group II 67.9 ± 10.2 kg, this difference was not statistically significant (p=0.243). Height (mean ± SD) was 168.7 ± 4.1 cm with 169.3 ± 2.9 cm in group I and 168.1 ± 4.9 cm in group II, again this difference was not significant (p=0.093). Non-significant difference (p=0.510) was noted in BMI value among group I and group II (26.4 ± 2.9 vs 25.6 ± 2.6). Overall, there was no significant difference was present in these variables.Mean ± SD of RBS in needle group and in cannula over needle group was 10.2 ± 3.5 mg/dl and 9.6 ± 3.4 mg/dl, respectively and this difference was non-significant (p=0.306). In former group mean HCT was 40.4 ± 1.9 % and in later group level was 40.1 ± 1.5 % and this difference was statistically significant (p=0.266). No significant difference was noted in platelet count and S. creatinine value among needle group and Cannula over needle group (271.7 ± 74.4 ×103 /mm3 vs 270.2 ± 75.6 ×103 /mm3; 1.2 ± 0.15 mg/dl vs 1.2± 0.18 mg/dl).

Table 3 showed in group I, 25 (41.7%) patients were hypertensive, close to group II (40.7%)which was statistically not significant (p=0.98). For DM, not significant difference (p=0.715) existed between group I and group II (50.0 % vs 46.7%). 24 (40%) patients in group I and 33 (55.0 %) patients in group II were dyslipidaemic and this difference was not statistically significant (p=0.100). No significant difference was present in smoking among these two groups with p value 0.090. Overall, there was no significant difference in traditional cardiovascular risk factors between these two groups.

69 (57.5%) patients underwent CAG ± PCI for CCS, 30 (50%) patients in group I and 39(65%) in group II. Similarly, distribution of other indications in group I and group II were not statistically significant (p=0.366) (Table 4).

First attempt was successful in 27 (45%) patients in group I and 39 (65%) patients in group II and this difference was statistically significant(p=0.028) (Table 5). Cannula over needle technique showed statistically significant successful first attempt rate in comparison with Needle technique.

Total 12 (20%) patients needed cross-over to other site for cannulation in Needle technique, whereas only 6 (10%) patients needed to switch to other site in Cannula over needle technique and this difference was statistically significant (p=0.040) (Table 6).

Access time (mean ± SD) was 4.7 ±2.1mins in group I and 4.3 ± 2.1mins in group II, this difference was significant (p=0.046). Mean ± SD of procedure time was 48.23 ±27.1 minutes in studied samples. In group II it was 49.9 ± 23.9 min. and in group I it was 51.5± 29.7 mins. This difference was not statistically significant (p=0.078). Significant difference (p= 0.025) was noted in number of attempts among group I and group II (1.75± 0.8 vs 1.45 ± 0.68) (Table 7).

Table 8 showed comparison of access time, procedure time and number of attempts among studied samples who underwent CAG. Access time and number of attempts was significantly lower with cannula over needle technique compare to needle technique, p value 0.048 and 0.032, respectively. There was no statistically significant difference in procedure time between these two groups (24.9 ± 3.5 vs 26.0 ± 4.74 min, p= 0.312).Access time of patients who underwent PCI in our study samples had significantly lower with cannula over needle technique (5.1 ± 2.1 vs 4.1 ± 2.1min, p=0.037). Similarly, number of attempts were also lower with cannula but total procedure time was not significantly different between these two techniques.

Table 3: Comparison of the study groups according to their risk factors.

Cardiac risk factor profiles	Total (n=60)		Group-I (n=30)		Group-II (n=30)		P value
	n	%	n	%	n	%	
Hypertension	50	41.7	25	41.7	25	40.7	0.98ns
Diabetes mellitus	58	48.3	30	50	28	46.7	0.715 ns
Dyslipidemia	57	47.5	24	40	33	55	0.100ns
Smoking	75	62.5	42	70	33	55	0.090 ns

Table 4: Comparison of indication among studied samples.

Indication	Group I (n=60)n (%)	Group II (n=60)n (%)	Total(n=60) n (%)	p-value
UA	3(5)	3(5)	6(5)	0.366ns
NSTEMI	21 (35)	15(25)	36(30)	
CCS	30 (50)	39(65)	69(57.5)	
STEMI	6(10)	3(5)	9(7.5)	
Total	60 (100)	60(100)	120(100)	

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Table 5: Comparison of successful first attempt among studied samples.

First attempt success	Group I (n=60)n(%)	Group II (n=60) n(%)	Total (n=120)n (%)	p-value
Yes	27 (45)	39(65)	66(55)	0.028s
No	33(55)	21(35)	54(45)	
Total	60(100)	60(100)	120(100)	

Table 6: Comparison of cross-over rate among studied samples.

Crossover	Group I (n=60) n (%)	Group II (n=60) n(%)	Total (n=120) n(%)	p-value
Conventional radial	10 (16.7)	5(8.4)	15(12.5)	0.040s
Femoral	2 (3.3)	1(1.6)	3(2.5)	

Table 7: Comparison of access time, procedure time and number of attempts among studied samples.

	Total(n=120)	Group I(n=60)	Group II(n=60)	p-value
Access time (min)	4.5 ±2.1	4.7 ± 2.1	4.3 ± 2.1	0.046s
Procedure time (min)	48.23 ±27.1	51.5 ± 29.7	49.9 ± 23.9	0.078ns
Number of attempts	1.6 ± 0.74	1.75 ± 0.8	1.45 ± 0.68	0.025s

Table 8: Comparison of access time, procedure time and number of attempts among studied samples who underwent CAG and PCI.

underwent CAG	Total(n=60)	Group I(n=30)	Group II(n=30)	p-value
Access time (min)	4.35 ±1.9	4.4 ± 2.1	4.3 ± 1.7	0.048s
Procedure time (min)	25.45 ±4.2	24.9 ± 3.5	26.0 ± 4.74	0.312ns
Number of attemptsunderwent PCI	1.65 ± 0.79	1.70 ± 0.8	1.50 ± 0.68	0.032s
Access time (min)	4.6 ±2.3	5.1 ± 2.1	4.1 ± 2.1	0.037s
Procedure time (min)	71.0 ±20.1	77.0 ± 20.7	65.0 ± 17.8	0.068s
Number of attempts	1.55 ± 0.67	1.80 ± 0.76	1.3 ± 0.46	0.004s

Table 9: Comparison of complications among study samples who underwent CAG and PCI.

Complications	Total (n=60)		Group-I (n=30)		Group-II (n=30)		p value
CAG	n	%	n	%	n	%	
Hematoma	4	6.7	3	10	1	3.3	0.506ns
Radial artery spasm	6	10	3	10	3	10	0.540 ns
Radial artery occlusion	3	5	2	6.7	1	3.3	0.791ns
PCI							
Hematoma	6	10	3	10	3	10	0.998 ns
Radial artery spasm	6	10	4	13.3	2	6.7	0.740 ns
Radial artery occlusion	6	10	4	13.3	2	6.7	0.691ns

Table 9 showed comparison of complication who underwent CAG in our study samples. Overall, no significant difference was noted in complications between needle group and cannula over needle group.Those patients who underwent PCI in our study samples showed that hematoma, radial artery occlusion and radial artery spasm was not significantly different between needle group and cannula over needle group, with p value 0.998, 0.691 and 0.740 respectively.

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Discussion

The study was conducted at the Department of Cardiology at National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh from July 2020 to June 2021for a period of one year. During this study period, 120 samples were collected and grouped into Needle technique (n=60) and Cannula over needle technique (n=60).The age distribution of the samples showed highest frequency (55%) was seen in 51-60 years age group followed by 41-50 years group. This finding was close to a Bangladeshi study where they reported highest frequency from 51- 60 years age group [10]. On the contrary, Ahmed and his colleagues reported 41% of their study samples belonged to 41- 50 years age group [11]. Mean age of our study samples were close to previous study in our population [11]. A Turkish study reported mean age of 60 ± 13 years, much higher than our study Kundi et al. [12]. This discrepancy supports the concept of earlier incidence of CAD in Bangladeshi population [13]. There was no difference in either mean age and distribution of age among study samples in this study. About 81% of our study samples were male. Sabah et al. [14] reported similar frequency of gender distribution in our population.In this study, hypertension, DM, dyslipidemia and smoking an family history of CAD was present in 41.7%, 48.3%, 47.5% and 62.5%, respectively. Our study results were very similar to that reported previously in our study population [10]. Although, other cardiovascular risk factors were similar to our report, smoking was bit higher than our findings in study conducted in same center [15]. During the study period, 69 (57.5%) patients had chronic coronary syndrome, and rest were acute coronary syndrome. Akanda et al. [16] reported majority of Bangladeshi population had coronary angiography due to acute coronary syndrome. There was nostatistically significant difference in distribution of indications between group I and group II (p=0.366).In this study, 12 (20%) patients need cross over to either conventional radial or femoral approach in group I (Needle technique) whereas in group II (cannula over needle technique) only 6 (10%) patients were needed to switch the access site and the difference was statistically significant (p=0.040). Pancholy and his colleagues compared these two techniques for conventional radial approach and found that 10.8% patients in Needle techniques required crossover whereas none in Cannula over needle technique [17]. However, Koutouzis et al. [18] reported these frequency was 4.8% and 5.6%, respectively. Access time was significantly (p=0.046) lower with Cannula over needle technique compared to Needle technique (4.3 ± 2.1 vs 4.7 ± 2.1 minutes) in this study. Our findings was similar to that described previously by a study, where access time with Cannula over needle technique was much shorter than needle technique [17]. But the actual difference in access time from our study and that described Pancholy et al. [17] was explained by the fact that in distal radial approach cannulation time was much longer (269 ± 251 sec vs 140 ± 161 sec) compared with conventional radial approach.In our study,total procedure time was comparable in two groups without any statistical difference. However,Pancholy et al. [17] showed Cannula over needle technique significantly reduces total procedure time in comparison with needle technique, which goes against our study result.First attempt was successful in 65% of cases with Cannula over needle and 45% of cases with needle technique (p=0.028). Mean number of attempts was also significantly lower with Cannula over needle technique (1.45 ± 0.68sec vs 1.75 ± 0.8 sec, p = 0.025). This finding was also similar to that reported by Pancholy et al. [17]. So, in term of efficacy cannula over needle (Seldinger technique) was better than Needle technique (modified Seldinger technique).Hematoma was present in 10 (8.3%) patients in our study samples, 6 in group I and 4 in group II and the difference was not statistically significant (p=0.206). EASY grade ≥III hematoma was present in 0.4% and 0.8% in Cannula over needle technique and Needle technique in a study respectively [18]. But as we consider minor hematoma, incidence of hematoma was higher in our study. Similarly, Pancholy et al. [17] reported non-significant difference in hematoma with these two techniques. Radial artery spasm was present in 12 (10%) patients in this study and frequency was not significantly different between the groups. The reported frequency of radial artery spasm was reported in between 2-18%. Female sex, large sheath size, multiple catheter exchanges, small and tortuous radial artery, high takeoff of the radial artery and/or excessive manipulation and lack of operator experience were known to be associated with radial artery spasm [19].Radial artery occlusion (RAO) was present in 9 (7.5%) patients in our study and non-significant difference existed between group I and group II (10% vs 5%, p=0.491). Previously a study in our center reported RAO rate was 9.6%, close to our study Matin et al. 2020 [20]. There was no difference in radial artery occlusion with Cannula over needle versus Needle was reported by Pancholy et al. [17] (8% vs 7.9%, p>0.5). Koutouzis et al. [18] reported RAO rate was 6.8% and 3.6% with these two techniques and the difference was non-significant. So, overall complication rate was similar between these two techniques. In this study, complication rate was slightly higher compared to some previous studies. In a single operator study revealed CAG can be done as day care procedure. There was no bleeding complication reported by patients and only 4% RAO detected in follow-up [21].We also performed sub-group analysis of access time, total procedure time and number of attempts who underwent CAG and CAG with PCI. In our study, 60 patients had CAG only, 30 in group I and another 30 in group II. In CAG cohort, access time and number of attempts was significantly lower with cannula over needle technique but total procedure time was somehow similar with both techniques. Again, in PCI cohort, among 60 patients (30 group I, 30 group II) result was similar in term of efficacy of these two techniques. For complications, subgroup analysis

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showed no statistically significantdifference between group I and group II in hematoma formation, radial artery spasm and radial artery occlusion whether patient had CAG or CAG with PCI.Although, Needle (modified Seldinger) technique may provide the theoretical benefit of single wall puncture but stabilization of needle in arterial lumen is very difficult [17]. That leads to decrease in access time, number of attempts and increase the success in first attempts in Cannula over needle technique (Seldinger technique). In Seldinger technique, radial artery is fixed and thus there is no rolling movement of artery. The potential drawback of this technique, posterior wall puncture, was usually well-managed with introducer sheath in the lumen, which tamponade the puncture [17]. As a result, complication rate was not different between Needle technique and Cannula over needle technique.

Conclusion

Cannula over needle technique was associated with shorter access time, higher success rates on first attempt and reduced cross over rate compared to Needle technique. In distal transradial approach, Cannula over needle technique is similarly effective and safe like conventional radial approach. Complications such as bleeding, radial artery spasm and radial artery hematoma were not different between these two groups. Distal transradial approach (dTRA) shows fewer cross over to femoral route as we can switch to conventional radial approach before going to femoral route.

Limitations of the study

Time and resources were limited.

- COVID-19 situation adversely affected admission of patients in hospital.
- This is single center study, that does not represent the situation of whole country.
- Pre procedural duplex study of radial artery was not done.
- No Follow-up visit and Doppler evaluation was done to find out late radial occlusion.
- Most of the operators contributing in this study were more oriented with Cannula over needle technique.

Recommendation

Cannula over needle technique has better efficacy profile (access time, procedural time, number of attempts) compared to Needle technique in distal transradial approach (dTRA). In emergency cardiac intervention procedures, where shorter access time and less number of attempts are expected, Cannula over needle technique is better choice. Cannula over needle technique has similar complication rate despite posterior wall puncture. dTRA may be the preferred approach for radial cannulation preserving the conventional radial access before converting to femoral route.

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