

Change in the Diameter of the Radial Artery after TRA or TRI

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Subjects and Methods

For 1483 TRA/TRI procedures performed in 853 cases at our hospital, with measurements of the radial artery diameter pre-and-post-procedure performed using body-surface echography, we determined whether the changes in the radial diameter differed as a result of certain parameters. In addition, we included findings from available intravascular ultrasound scans for patients who underwent TRI.

Patient Baseline Characteristics 1

N	853
Age	69.8±11.0(24-92)
%male	55.5% (473case)
%DM	22.4%(191)
%HT	58.1%(496)
%HL	29.5%(252)
%obesity	24.3%(207)
%smoker	14.5%(124)

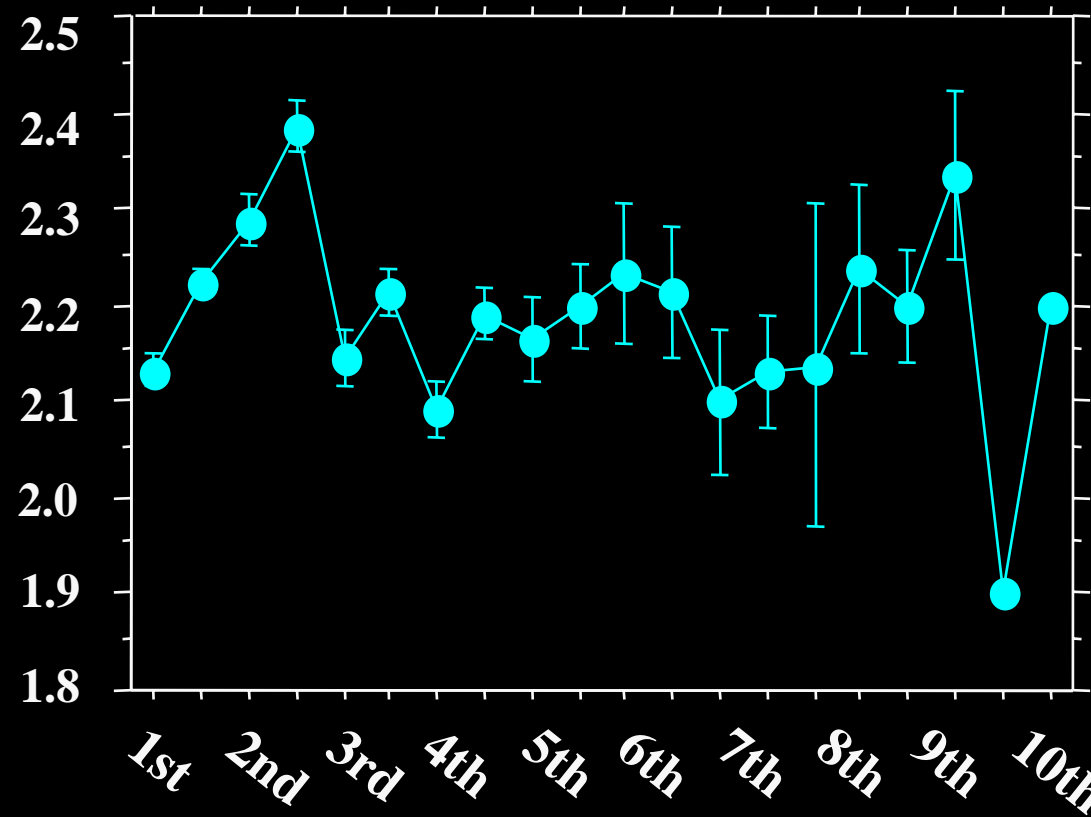
Patient Baseline Characteristics 2

No. of insertions		Size of Sheath Introducer	
1	641	4Fr	966(65.1%)
2	305	5Fr	95(6.4%)
3	228	6Fr	413(27.8%)
4	160	7Fr	9(0.6%)
5	87		
6	33		
7	17		
8	9		
9	3		

Patient Baseline Characteristics 3

	mean±SD	P
Male	2.23 ±0.43	<0.01
Female	2.05 ±0.39	
DM(+)	2.12 ±0.40	0.22
DM(-)	2.16 ±0.43	
HT(+)	2.13 ±0.44	0.21
HT(-)	2.16 ±0.43	
HL(+)	2.17 ±0.38	0.35
HL(-)	2.14 ±0.44	
Obesity(+)	2.27 ±0.41	<0.01
Obesity(-)	2.12 ±0.42	
Smoking(+)	2.22 ±0.44	0.09
Smoking(-)	2.15 ±0.41	

Changes in Radial Diameter Over Time 1(Overall)



Changes in Radial Diameter Over Time 2

Excluding cases involving multiple insertions during the same hospitalization

	N	Pre	Post
1st	27	1	1.04 ± 0.15
2nd	27	0.97 ± 0.23	1.03 ± 0.23
3rd	14	0.97 ± 0.19	1.02 ± 0.18
4th	6	0.96 ± 0.19	1.08 ± 0.25

29 cases involving multiple insertions during the same hospitalization

	N	Pre	Post
1st	29	1	1.07 ± 0.20
2nd	29	1.10 ± 0.77	1.13 ± 0.99
3rd	29	1.10 ± 0.19	1.12 ± 0.21
4th	2	1.07	1.01

No significant difference in radial diameter after the 3rd & 4th insertion (p=0.69, 0.79)

Changes in Radial Diameter after Insertion (Sheath outer diameter and vessel diameter) Overall

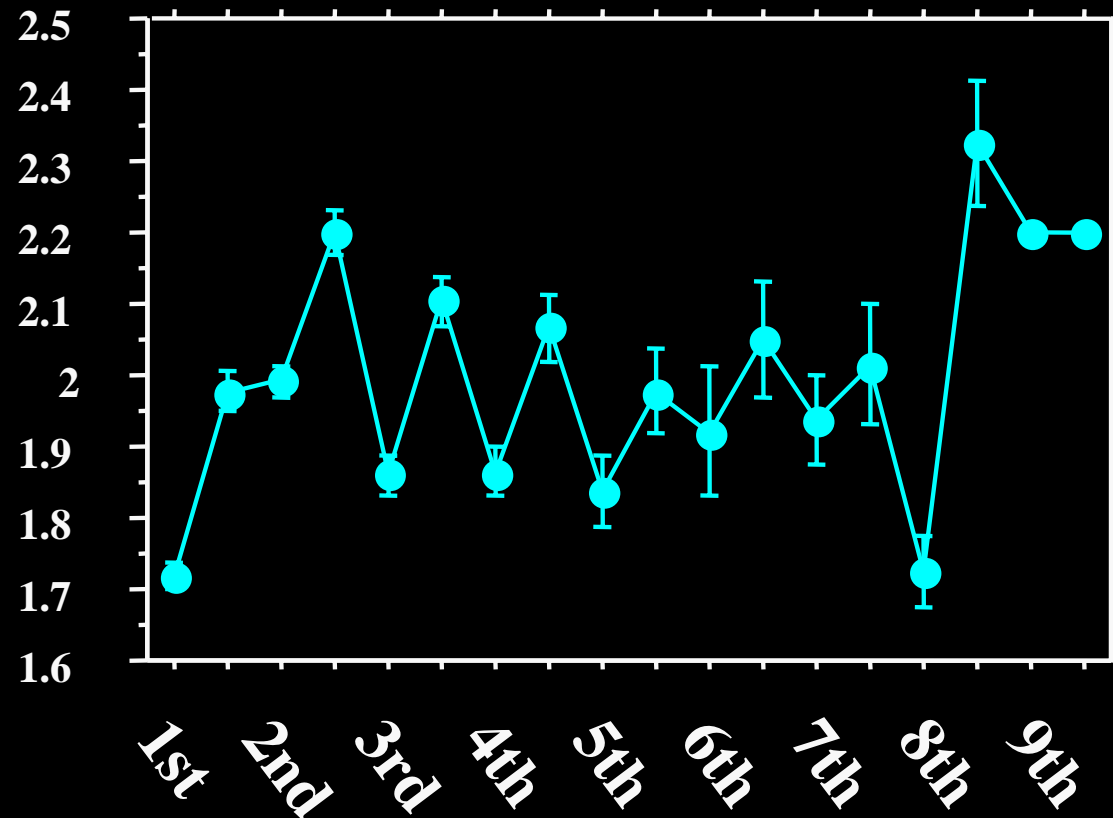
4Fr	N	Mean ± SD	P
≥ 1.9mm	728	0.97 ± 0.12	
< 1.9mm	238	1.11 ± 0.19	<0.001

5Fr	N	Mean ± SD	P
≥ 2.1mm	49	0.96 ± 0.12	
< 2.1mm	46	1.10 ± 0.19	<0.01

6Fr	N	Mean ± SD	P
≥ 2.5mm	129	0.97 ± 0.12	
< 2.5mm	284	1.11 ± 0.19	<0.001

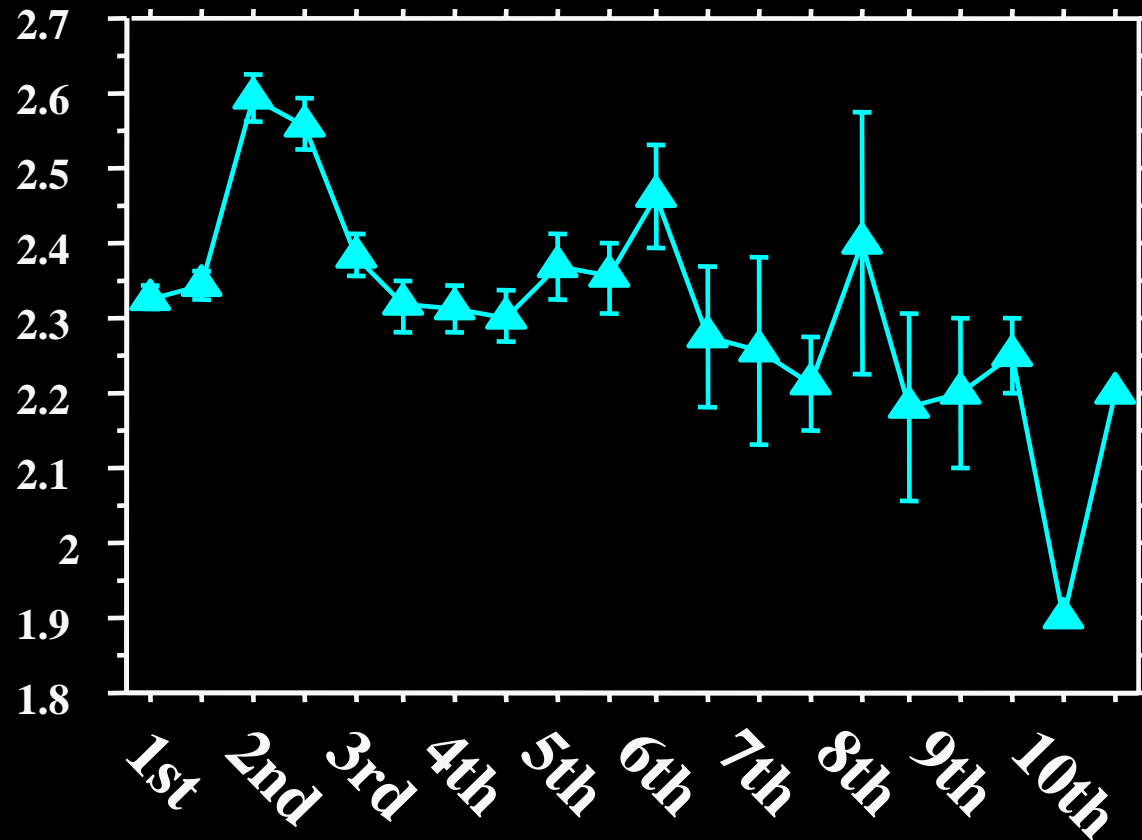
Changes after insertion in the ratio to the baseline (1.0), which is the radial diameter before insertion

Changes in Radial Diameter after Insertion1



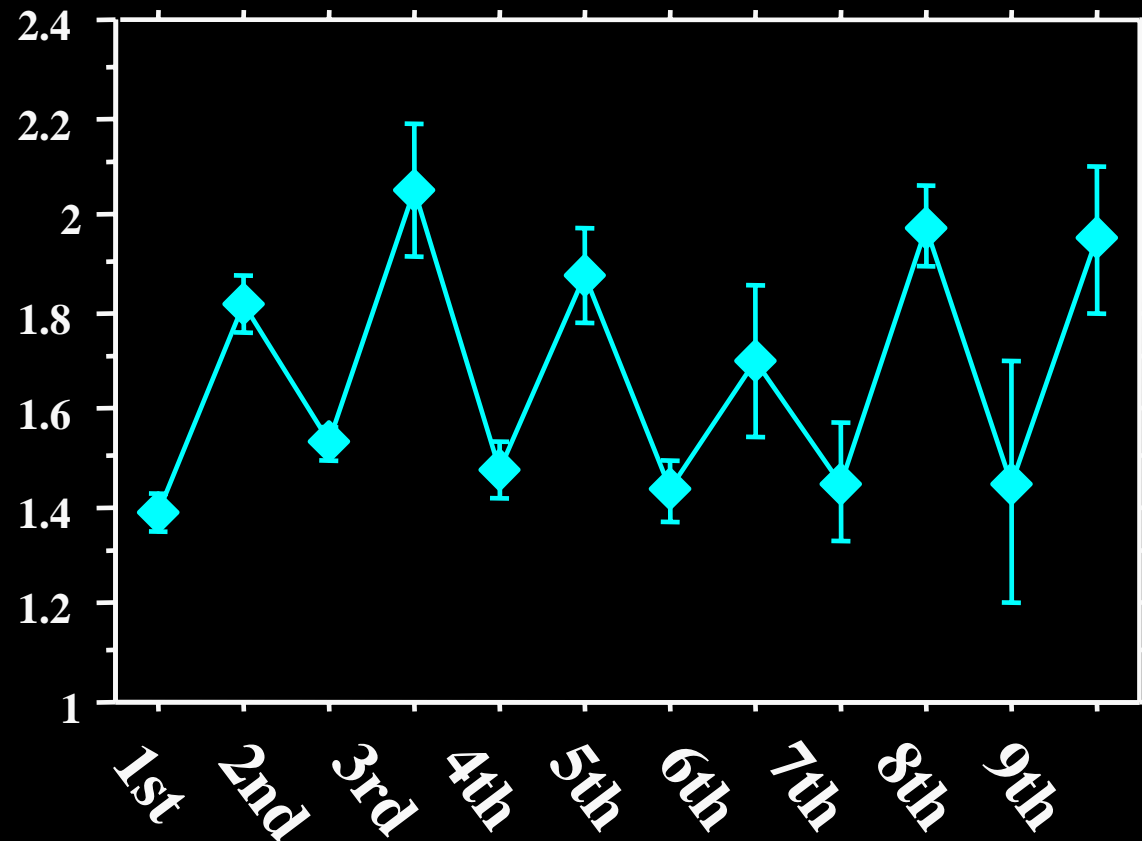
Patients with a vessel diameter smaller than the sheath outer diameter

Changes in Radial Diameter after Insertion2



Patients with a vessel diameter greater than the sheath outer diameter

Changes in Radial Diameter after Insertion³



Patients with a vessel diameter smaller than the sheath/artery ratio (1.4)

Complications

N(2000.6.1-2003.12.31)	2409
Complications	53(2.2%)
Occlusion	18(0.7%)
Pulse Weakness	23(0.9%)
Spasms*	11(0.5%)
False Aneurysm	1(0.004%)

(2000.6.1-2002.9.16)N=1413

Complications	32(2.2%)
Occlusion	14(1.0%)
Pulse Weakness	10(0.7%)
Spasms	7(0.4%)
False Aneurysm	1(0.07%)

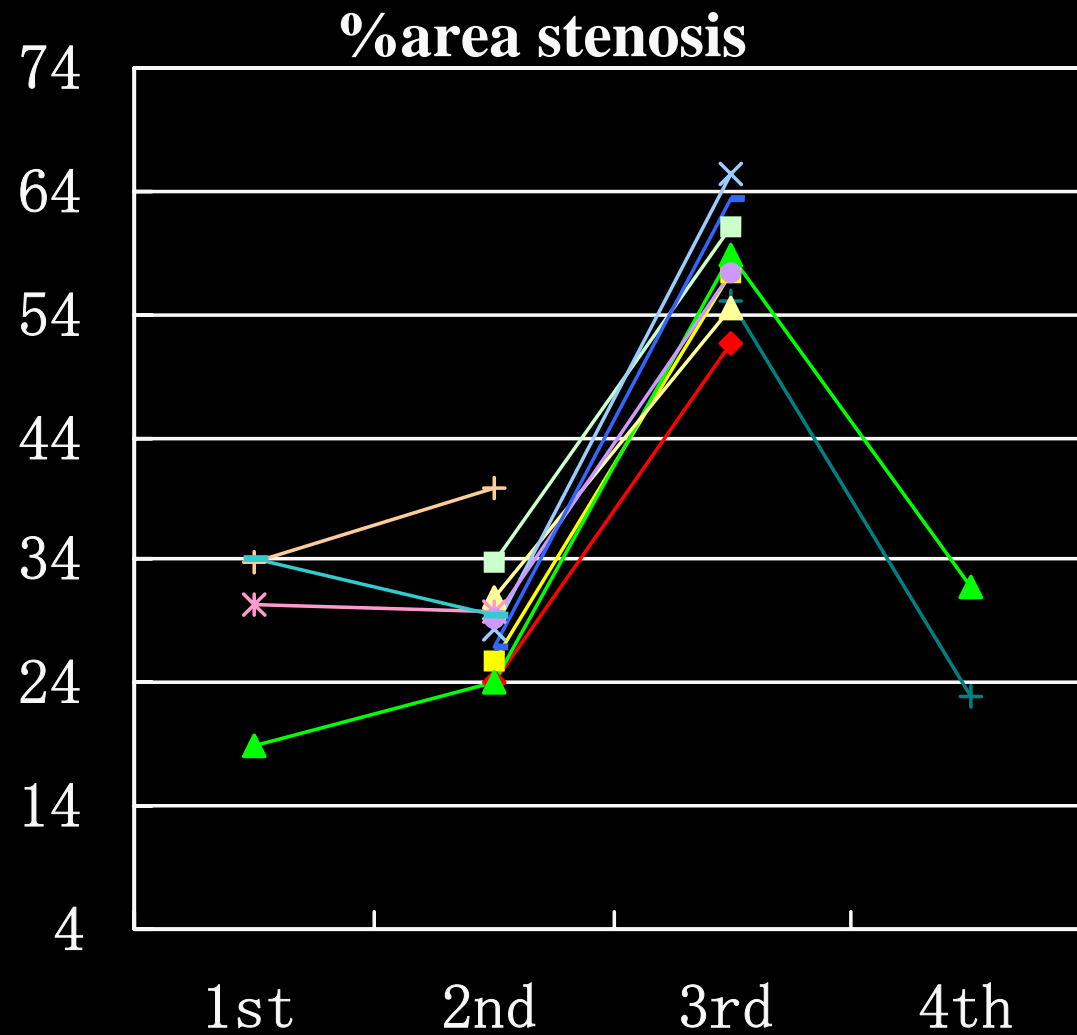
(2002.09.17-2003.12.31)N=996

Complications	21(2.1)
Occlusion	3(0.3%)
Pulse Weakness	14(1.5%)
Spasms	4(0.4%)
False Aneurysm	0

*Difficult withdrawal of the sheath led to the use of ISDN, etc., or the patient refused the radial approach for subsequent TRA.

Changes in the radial artery observed by IVUS

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Summary 1

- 1. It was possible to repeat puncture attempts up to ten times for TRA or TRI during the study period.**
- 2. The diameter of the radial artery did not correspond to coronary risk factors or the number of punctures.**
- 3. When the radial artery diameter was larger than the sheath outer diameter before the puncture, it tended to become smaller after the procedure.**
- 4. When the radial artery diameter was smaller than the sheath outer diameter before procedure, it tended to become larger owing to the bougie-like effect of the sheath outer diameter.**

Summary 2

- 5. Intravascular ultrasound examination suggested that narrowing of the radial artery was associated with neointimal hyperplasia. In patients in whom the radial artery was narrowed in association with neointimal hyperplasia, a bougie-like effect was observed by inserting the sheath.**
- 6. Occlusion of the radial artery occurred in 0.7% of patients who underwent TRA or TRI during the study period, however, the incidence of occlusion did not correspond with radial artery diameter or any of the other parameters.**

Conclusion

The narrowing of the radial artery decreased the rate of successful puncture, but did not induce occlusion of the radial artery. When the narrowing of the radial artery exceeded a certain degree, the sheath was found to act as a bougie, thereby expanding the radial artery. This suggests that PCI using a radial artery approach may be more beneficial than expected. Further studies are required to investigate methods for increasing the rate of successful puncture and hemostatic procedures for decreasing the rate of occlusion the radial artery.