New method of compression after coronary angiography and intervention from proximal and distal radial approaches in randomized comparison with standard compression

- analysis of 500 patients

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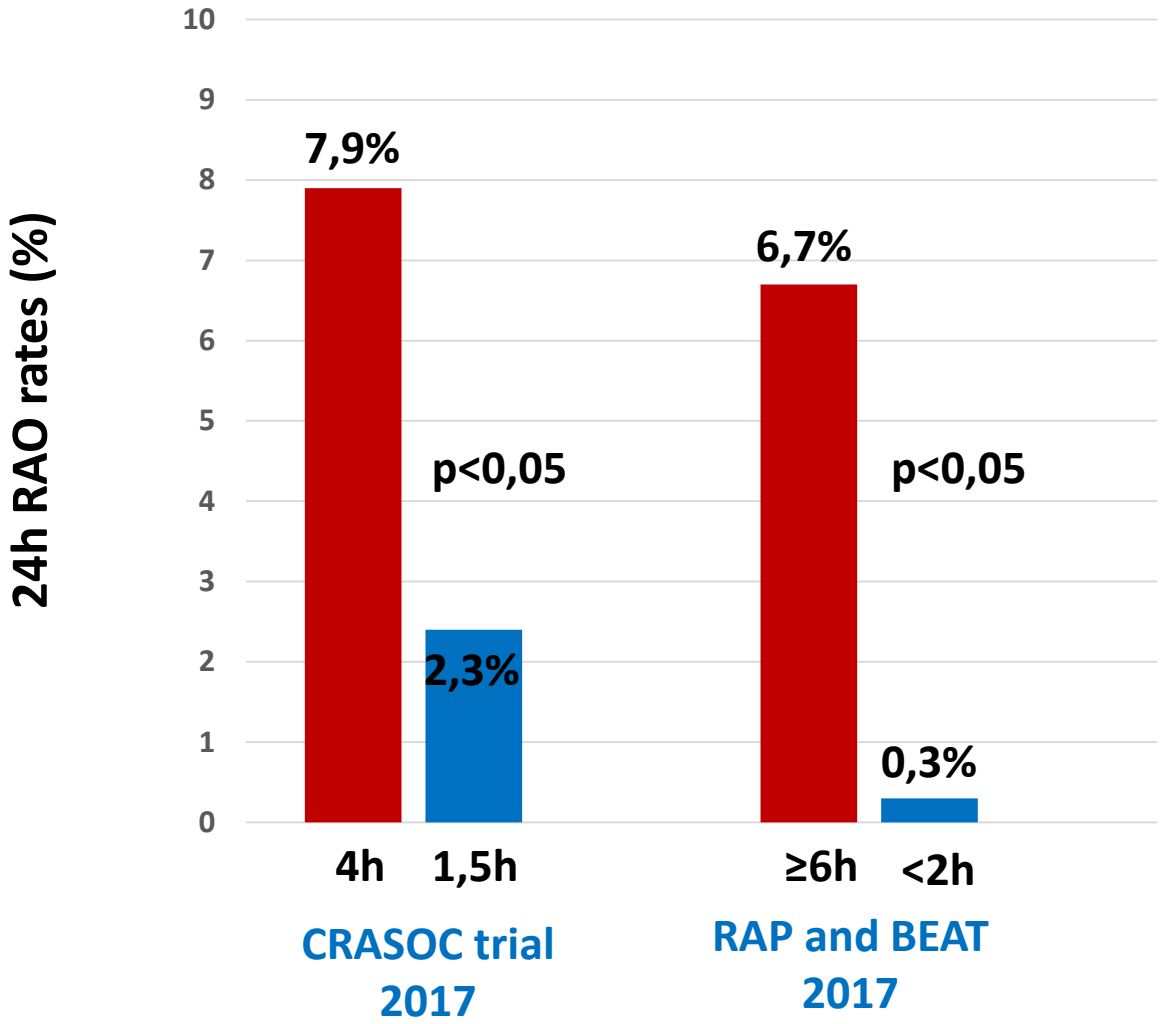
Background:

Duration and intensity of the radial artery compression after interventional procedures affect the occurrence of postprocedural local complications including radial artery occlusion and hematoma.

We investigated the use of standard mechanical compression and its combination with kaolin-impragnated gauze patch as a new method of hemostasis.

Blood stasis: importance of compression time

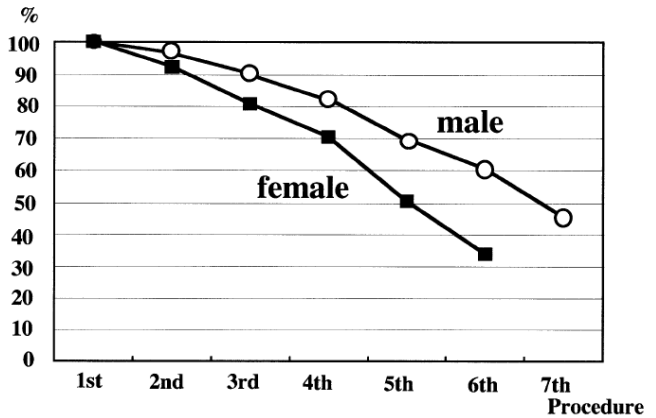


JACC: CARDIOVASCULAR INTERVENTIONS

VOL. 12, NO. 22, 2019

Best Practices for the Prevention of Radial Artery Occlusion After Transradial Diagnostic Angiography and Intervention

An International Consensus Paper



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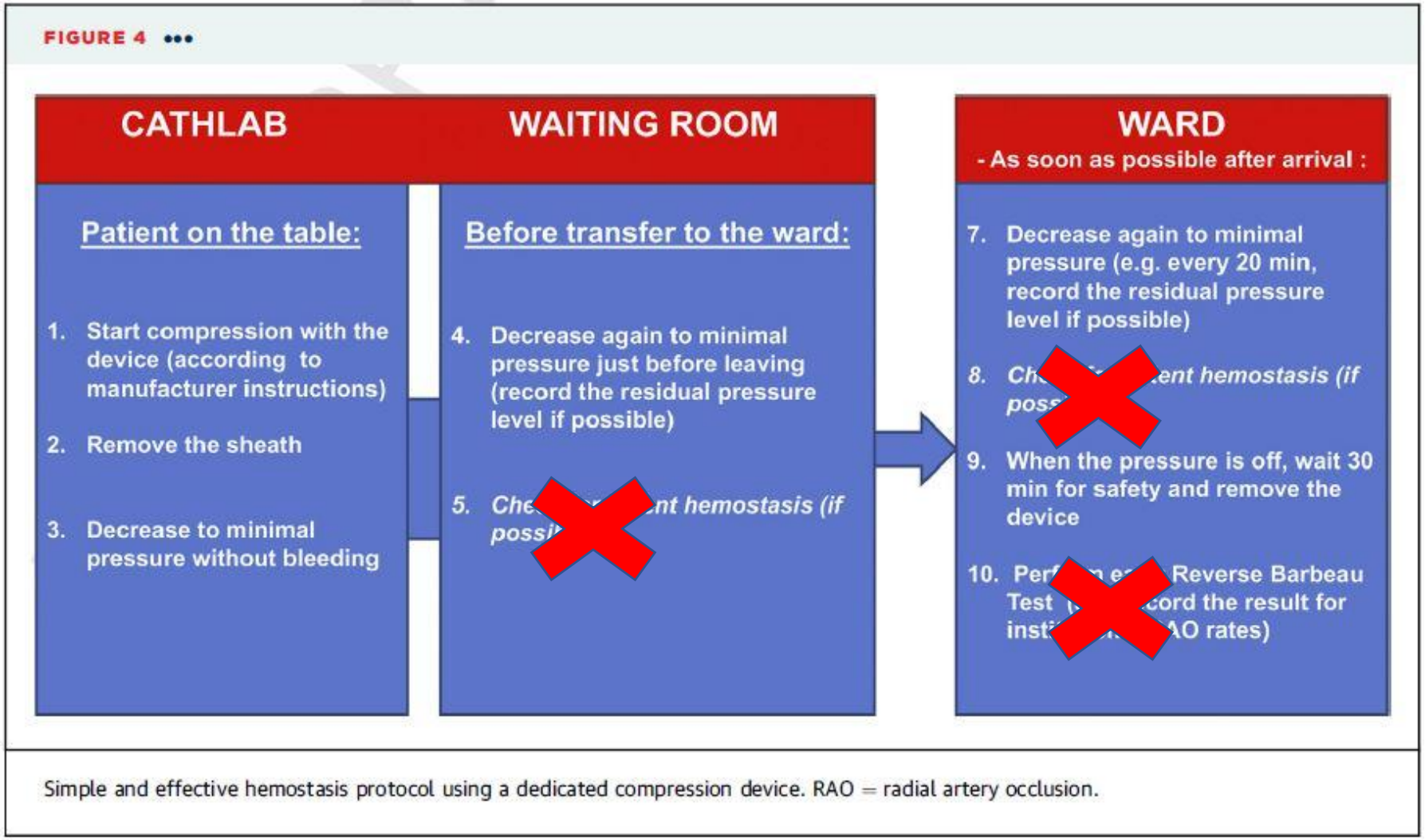
Recommended protocol of RA hemostasis on the wrist



Simple and effective hemostasis protocol using a dedicated compression device. RAO = radial artery occlusion.

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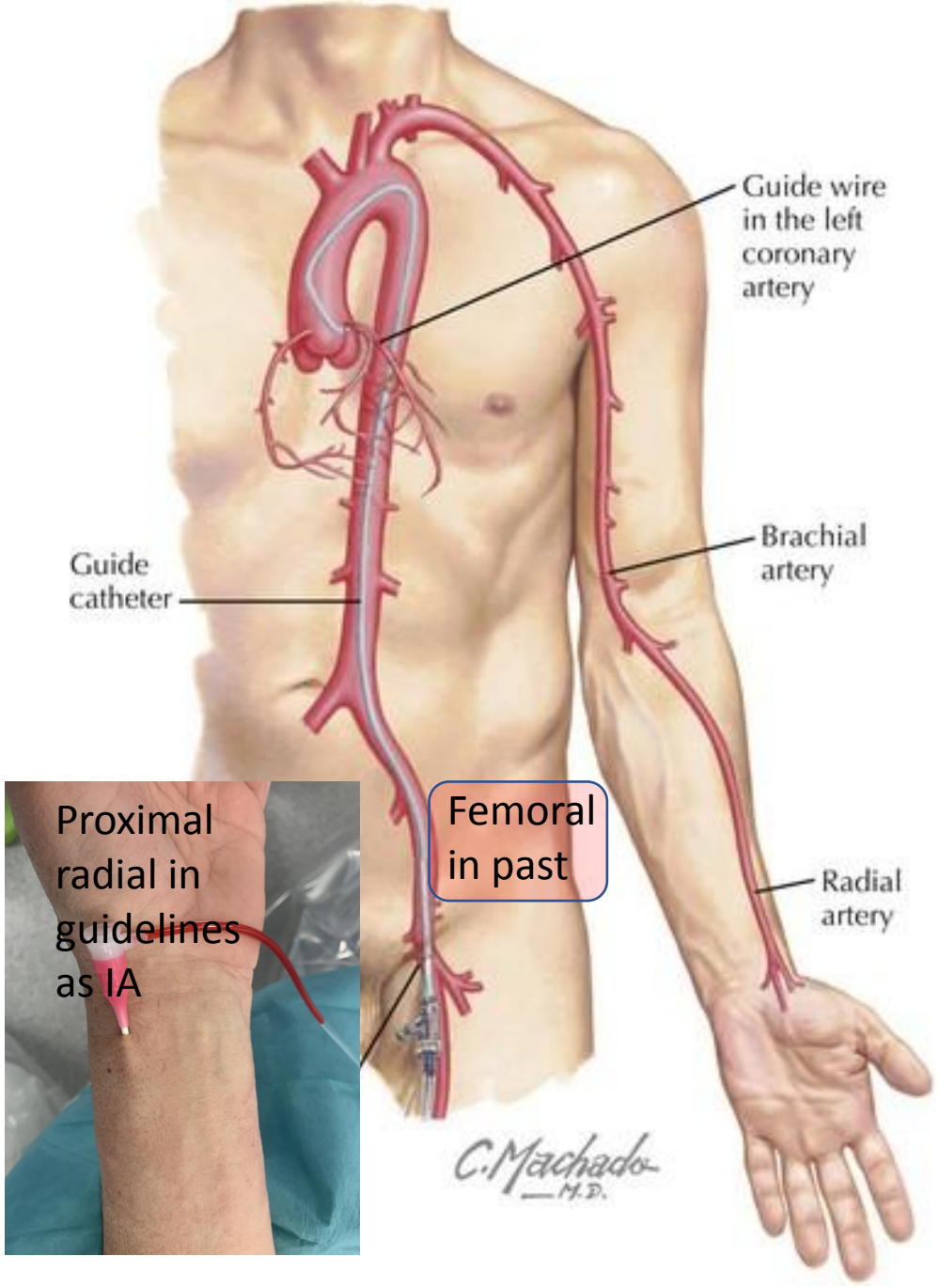
= not necessary in case of the distal radial approach



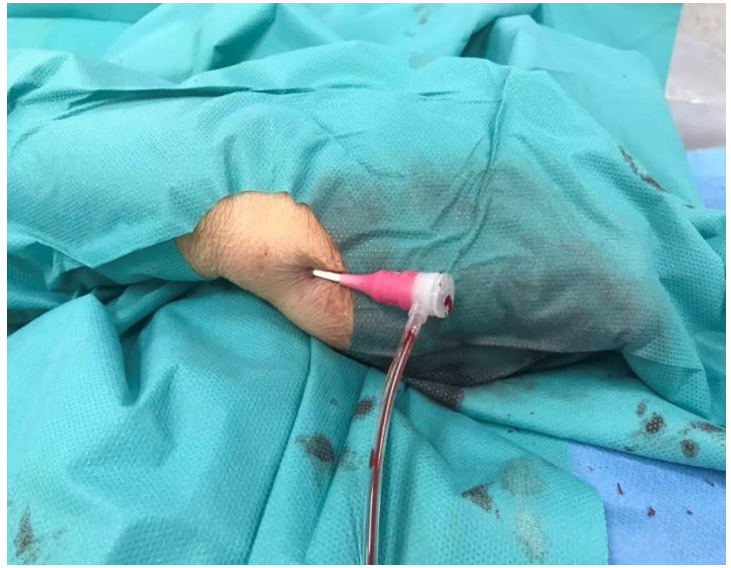
Femoral in past

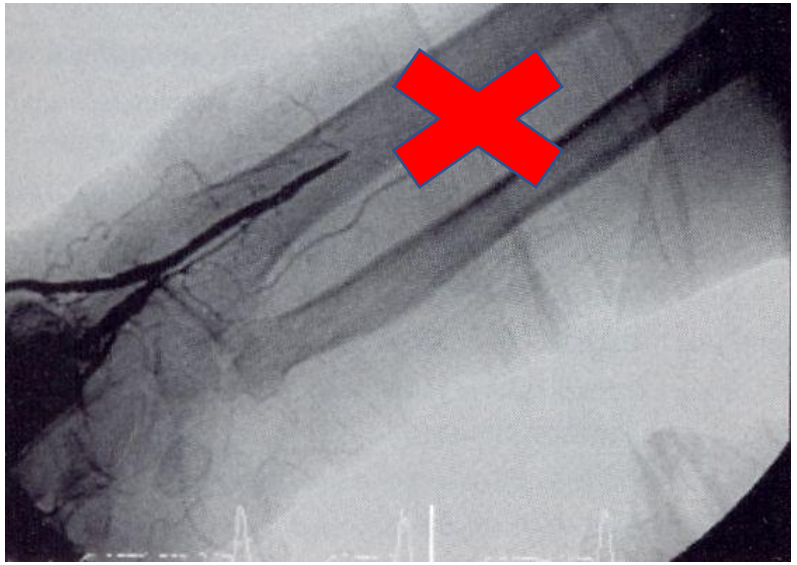
Distal radial

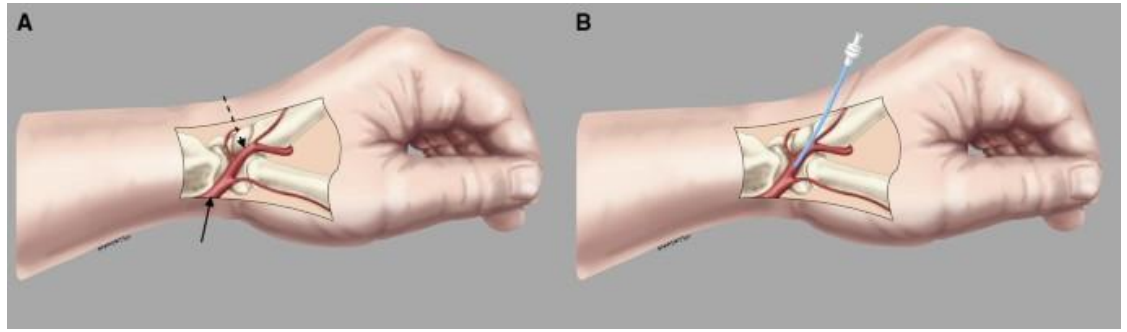
Why ???

proximal

Distal has benefits for our patients:







- Lower risk of RAO

- Lower risk of hematomas

- Shorter compression time

- Easier postprocedural care

- More approaches from one hand

- Easier left radial aproach

We investigated the use of standard mechanical compression and its combination with kaolin-impragnated gauze patch as a new method of hemostasis in patients from our same day discharge program between January and July 2023.

Methods :

Five hundred consecutive patients (66±8 years, 75% males) after coronary angiography (70%) and intervention (30%) from the proximal (PRA) and distal radial (DRA) approaches were analyzed.

Compression was performed by mechanical inflatable device (TR Band) **with or without kaolin gauze** - 170 versus (vs.) 170 patients in proximal groups and 80 vs. 80 patients in distal groups. Time to hemostasis and access site complications were analyzed.

Standard mechanical compression by TR Band

Proximal approach

Distal approach

New method of compression

- standard compression facilitated with kaolin patch

Proximal radial

Distal radial

Baseline Characteristics

	Proximal + kaolin	P -	Distal + kaolin	D-		Total	%
Number of patients	**170**	**170**	**80**	**80**		**500**	
male	116	125	72	61		374	**75%**
female	54	45	8	19		126	**25%**
age	65,8	65,9	65,2	65,3		65,6 +- 8,2	
BMI	29,5	30,0	29,8	30,1		29,8 +- 4,0	
hypertension	133	125	67	60		385	77%
dyslipidemia	116	135	62	62		375	75%
diabetes	54	52	26	18		150	30%
Smoking :							
currently	51	59	27	20		157	31%
exsmoker	31	23	8	7		69	14%
nonsmoker	88	88	45	53		274	55%

Baseline Characteristics

	P + kaolin (170)	P - (170)	D + kaolin (80)	D – (80)		Total (500)	
PAD	22	26	11	11		70	14,0%
COPD	12	14	3	5		34	7%
atrial fibrilation	33	27	16	13		89	18%
stroke/TIA	3	7	2	5		17	3%
CAD - family history	72	77	33	34		216	43%
CAD - patient´s history :							39%
STEMI	20	23	9	9		61	*12%*
NSTEMI	19	20	9	7		55	*11%*
Stable angina	21	12	9	10		52	*10%*
Unstable angina	1	0	1	0		2	*0,4%*
Cardiogenic Shock	2	0	1	0		3	*0,6%*
Other	2	5	1	0		8	*2%*
None	105	95	50	54		304	61%

Baseline Characteristics

LV ejection fraction	P + kaolin (170)	P -- (170)	D + kaolin (80)	D -- (80)		Total (500)	%
≤ 40%	28	29	11	9		77	15%
41-50%	19	27	8	9		63	13%
> 50%	123	113	61	62		359	72%
Indication							
angina pectoris	57	65	30	32		184	37%
dyspnoe	33	28	9	11		81	16%
atypical chest pain	20	19	12	10		61	12%
elective PCI *or* re-CAG	18	21	5	9		53	11%
heart failure	19	13	8	8		48	10%
history of MI	7	4	4	1		16	3%
positive stress test	3	3	4	1		11	2%
ECG changes	3	6	1	1		11	2%
angioCT findings	4	4	0	3		11	2%
ECHO findings	1	1	2	0		4	1%
other	5	6	5	4		20	4%

Baseline Characteristics

Medication	P+ kaolin (170)	P- (170)	D+ kaolin (80)	D- (80)		Total (500)	%
AA monotherapy	62	68	39	26		195	39%
ASA	61	65	38	24		188	38%
clopidogrel	1	3	1	2		7	1,4%
DAPT	52	46	19	23		140	28%
ASA + clopidogrel	41	31	15	19		106	21%
ASA + other (mainly ticagrelor)	11	15	4	4		34	7%
OAC	17	23	12	11		63	13%
DOAC	17	18	10	9		54	11%
warfarin	0	4	2	2		8	1,6%
LMWH	0	1	0	0		1	
AA+OAC	4	5	1	2		12	2,4%
triple therapy	11	3	1	4		19	4%
without any AT therapy	24	25	8	14		71	14%

Results

Baseline characteristics were similar in all four groups - proximal with kaolin (PK+) and without kaolin (PK-), distal with kaolin (DK+) and without kaolin (DK-).

Time to hemostasis was **57±20** min in PK+ vs **83±19** min in PK- group and **48±12** min in DK+ vs. **63±12** min in DK- group (both p<0,001).

Compression times in distal groups were significantly shorter in comparison with proximal groups (p<0,01).

Hematomas grade I (<5cm) were more often in proximal RA - 20% vs 6,9% in distal RA and similarly as grade II (<10cm) – in proximal RA **4,4**% vs **0,6%** in distal RA (both p<0,001).

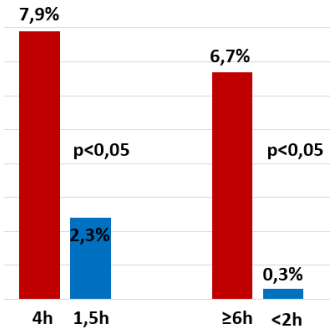
Only two patients with proximal RA had hematomas grade III (>10cm).

No patient had postprocedural radial artery occlusion.

Procedural characteristics and results

Type of procedure	P+ (170)	P- (170)	D+ (80)	D- (80)		Total (500)	%
CAG	110	124	58	57		349	70%
CAG + PCI	60	46	22	23		151	30%
Procedural time (min)	24,3	23,6	23,6	23,6		23,8+-12,1	
Fluoroscopy time (min)	6,1	5,5	4,7	4,8		5,3+-3,8	
Contrast consumption (ml)	114	105	112	106		109+-46,4	
Compression time (min)	**56,8**	**vs**	**82,6**	**48,1**	**vs**	**62,7**	**62,5+-17,7**

No patient had postprocedural radial artery occlusion.

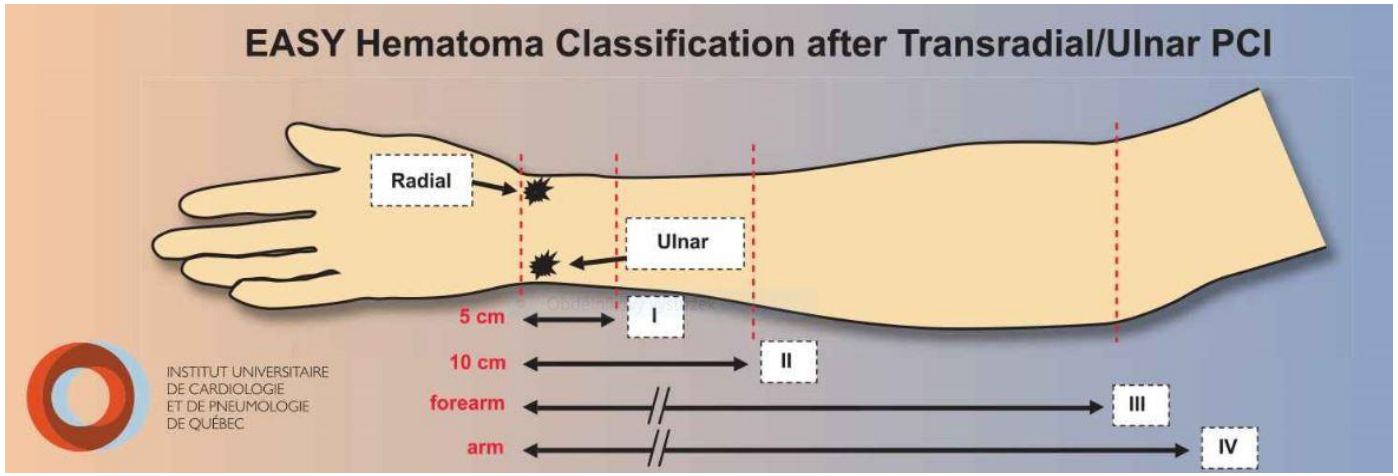


Complications

	P+ (170)	P- (170)	D+ (80)	D- (80)		Total (500)	%
Hematoma - Grade I	35	33	4	7	20% vs **6,9%**	79	15,8%
CAG	23	22	3	4		52	10,4%
CAG + PCI	12	11	1	3		27	5,4%
age (years)	69,7	68,7	69,6	72,3		**70,1**	
Hematoma - Grade II	10	5	1	0	4,4% vs **0,6%**	16	**3,2%**
CAG	7	2	1	0		10	2,0%
CAG + PCI	3	3	0	0		6	1,2%
age	69,3	75,0	80,6			**75,0**	
Hematoma - Grade III	1	1	0	0	0,6% vs **0,0%**	2	**0,4%**
CAG	1	0	0	0		1	0,2%
CAG + PCI	0	1	0	0		1	0,2%
age	75,7	83,4				**79,5**	
Radial artery occlusion (RAO)	0	0	0	0		0	0,0%

Note: 500 pts - age **65,6** years

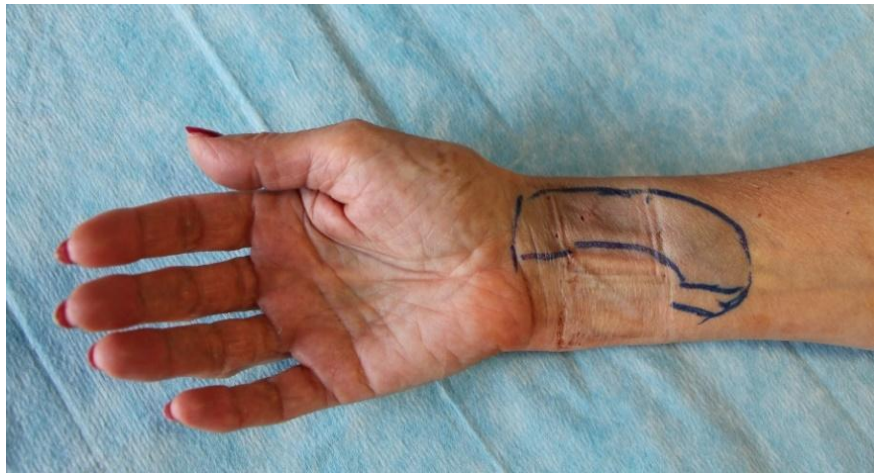
Hematomas



Grade IV.

Grade V.

Subcutaneous hematoma grade II. (10cm)



In our study:

grade II. 4,4% proximal vs 0,6% distal

grade III. 0,6% proximal vs 0,0% distal

Conclusion

The use of the new combined method of radial artery hemostasis was associated with shorter compression time both in proximal RA and distal RA in comparison with standard only mechanical compression.

Distal RA was associated with shorter compression time in both groups compared to proximal RA and almost absence of any local complications.

Local hematomas were dominantly observed in patients with proximal RA.

There were no radial artery occlusion in this analysis.