Increased risk of deep venous thrombosis after femoral pseudoaneurysm as a complication of percutaneous transluminal coronary angiography

-a retrospective study-

J. Jünger[1], M. Stolt[1], S. Peters[1], J. Lee[2], R. C. Braun-Dullaeus[1]and J. Herold[1]

(1) Otto-von-Guericke University of Magdeburg, Cardiology and Angiology, Magdeburg, Germany (2) Duke University School of Medicine, Durham, North Carolina, United States

Introduction

Pseudoaneurysm (PSA), with a rate up to 4%, is the most common iatrogenic complication after coronary angiography. The therapeutic management of PSA ranges from prolonged pressure bandage (PPB) to ultrasound-guided compression and further to ultrasound guided thrombin injection (UGT) and surgical intervention. All techniques suggest an increased risk for deep venous thrombosis (DVT). However, a systematic analysis for DVT and the direct comparison of different therapeutic strategies have not been performed until now.

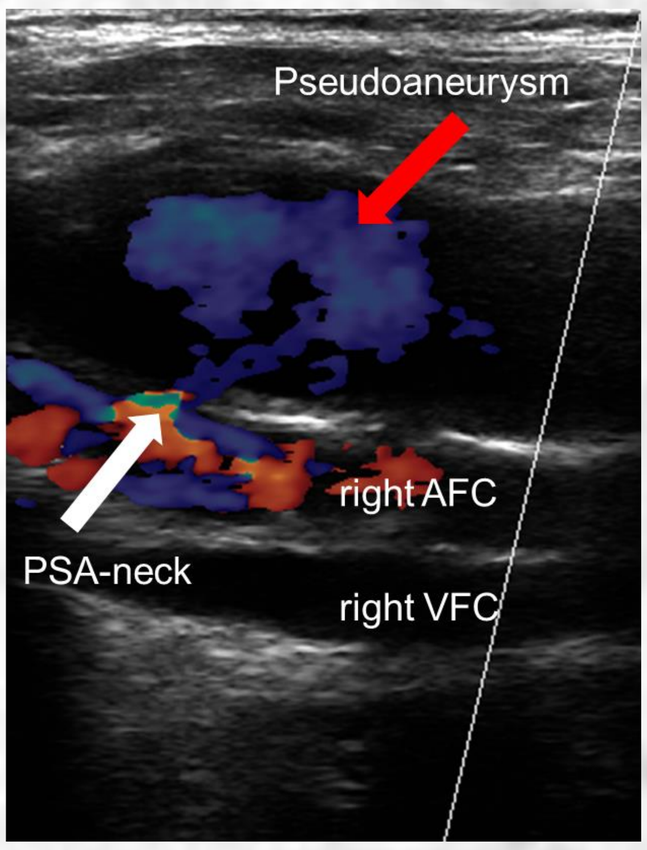


Fig. 1 Visualization of a PSA (red arrow) with blood flow within the right femoral artery (size: 3.6 x 5.5 x 2.5 cm) and PSA-neck (white arrow).

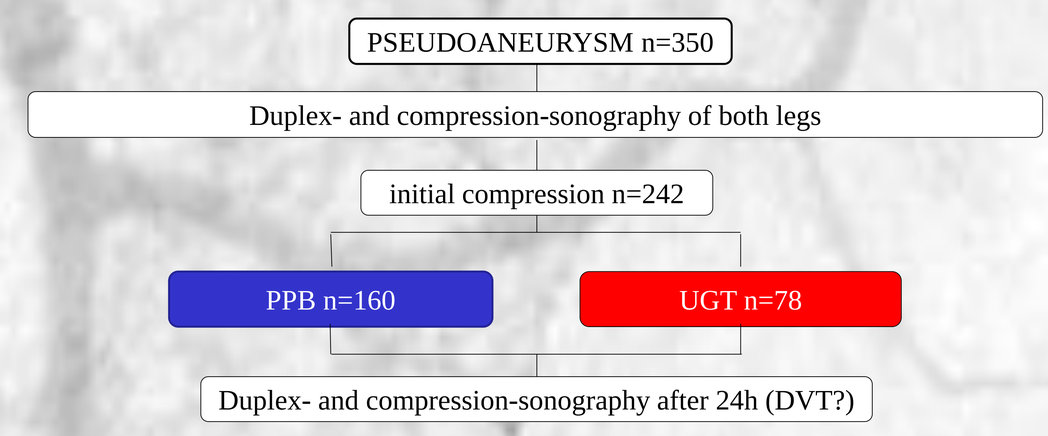
Aim

- To evaluate the efficiency and safety of ultrasound-guided thrombin injection as a first line treatment for iatrogenic femoral artery pseudoaneurysm
- To analyze systematically the incidence of lower limb thrombosis associated with the prolonged pressure bandage strategy and thrombin injection method

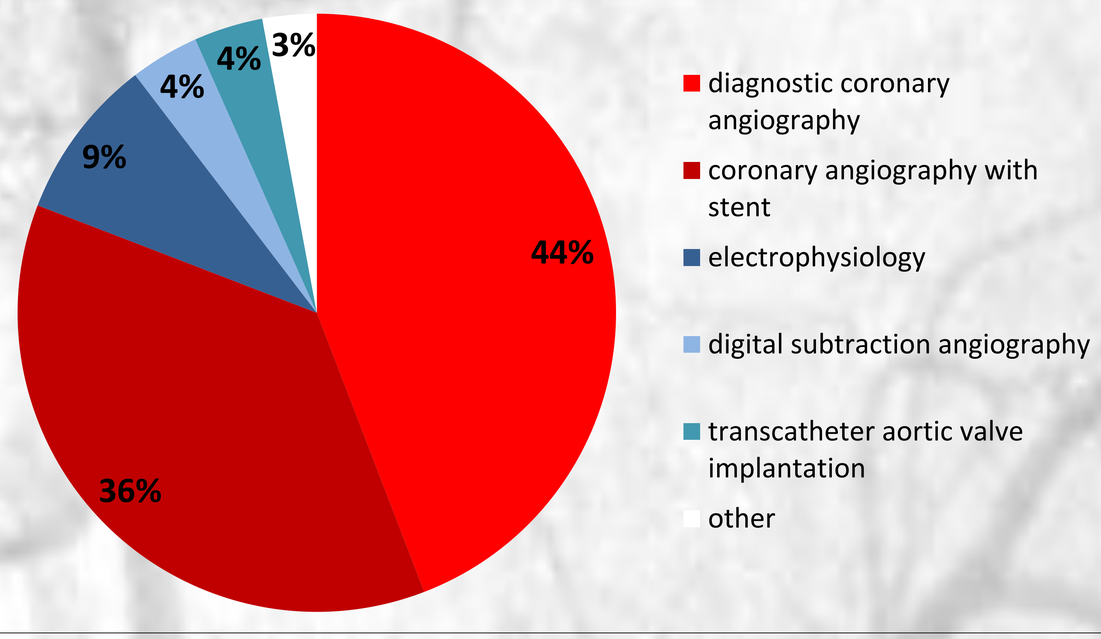
Methods

Three hundred fifty patients with PSA were examined, of which 242 patients had been included into the study. We only included patients without a DVT at the time of PSA detection. After initial compression, patients were treated with PPB (n=160) for 24h or UGT (n= 78; Tissuecol, Baxter USA) followed by PPB for 2h. Four patients were transferred to the vascular surgeon. All patients were screened intensively by duplex- and compression-sonography before and 24h after treatment (PPB vs. UGT) to evaluate for sufficient PSA treatment and incidence of DVT.

Study design



PSA relation to invasive procedures



Results

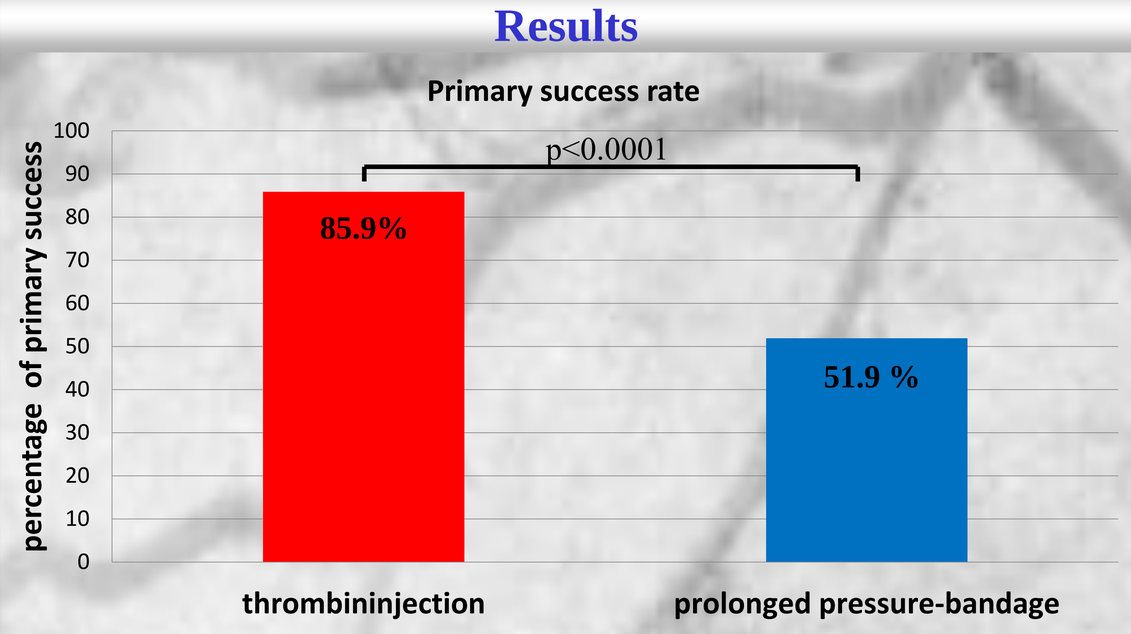


Fig 2: UGT-treatment was successful in 67 of 78 first-time attempts (success rate of 85.9% (95% confidence interval: 78.2%-93.6%), whereas in the PPB-group, compression was successful in 83 of 160 patients (success rate of 51.9%, with a 95% confidence interval: 44.4%-60.0%). This is a significantly lower success rate compared to UGT-treatment (p<0.0001, chi-square-test with n=238).

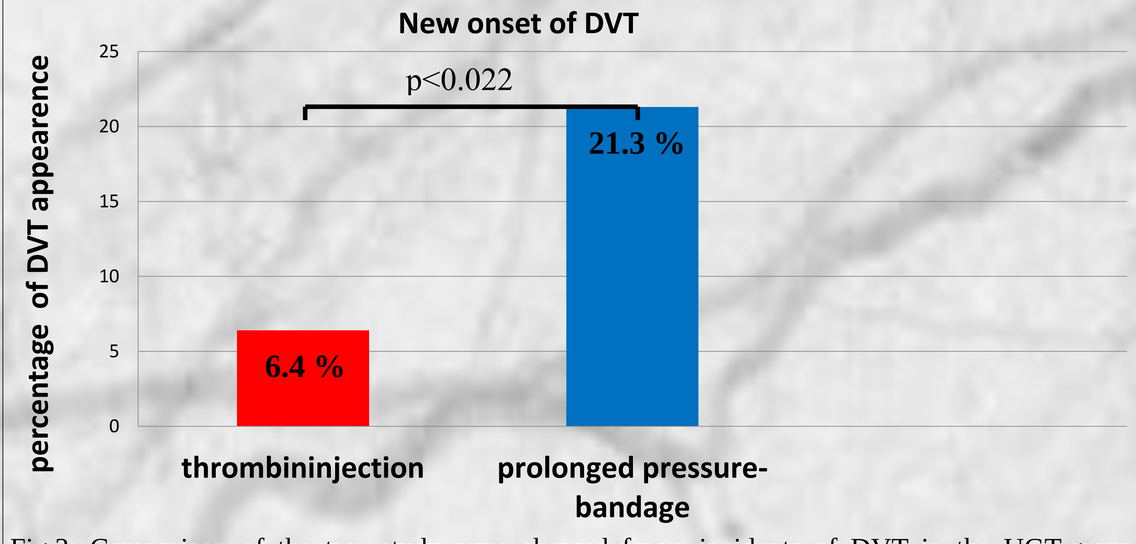


Fig.3: Comparison of the two study arms showed fewer incidents of DVT in the UGT-group (6.4%) as compared to the PPB-group (20.0%; p<0.022; chi-square-test with n= 242). There were two cases of arterial embolism (2.6%) in the UGT-group.

Distribution of medication

Medication	PPB n=147	UGT n=67	p-value
Heparin in %	50	49	0.956
Phenprocoumon in %	5	10	0.123
Acetylsalicylic acid in %	78	61	0.009
Antiplatelet drugs in %	49	34	0.036

Fig. 4: The distribution of medication shows a similar distribution of heparin and a higher percentage of phenprocoumon in the UGT-group. The significantly higher rates of acetylsalicylic acid (p<0.01; chi-square-test with n=214) and antiplatelet drugs (p<0.04; chi-square-test with n=214) in the PPB-group showed no influences on success-rates and DVT appearance.

Baseline-characteristics

Variables	UGT	PPB	p-value
Age (years)	70 ± 12	70 ± 11	0.98
Weight (kg)	84 ± 19	80 ± 17	0.11
Height (cm)	170 ± 9	168 ± 8	0.29
Gender (m/f)	59%/41 %	56%/44 %	0.66
Euroscore	5.7 ± 3,4	6,1 ± 3,6	0.5
RR syst (mmHg)	143 ± 26	141 ± 26	0.53
RR diast (mmHg)	70 ± 13	77 ± 14	0.17
Thrombocytes (1000/µl)	235 ± 114	233 ± 72	0.87
GFR (ml/min)	63 ± 24	68 ± 24	0.14
Haematocrit	39%	40%	0.31
Coronary heart disease	**70%**	**82%**	**0.045**
Diabetes mellitus	42%	34%	0.26
Hyperlipoproteinaemia	55%	55%	0.94
Nikotin abuses	72%	60%	0.27
Obesity	**68%**	**53%**	**0.042**
Hypertension (Syst. >160 mmHg)	24%	26%	0.78

Table 1: There are no significant differences in the baseline-characteristics, except “coronary heart disease” and “obesity”.

Summary

- ✓ Our study demonstrates the efficiency of therapeutic thrombin injection for the PSA treatment.
- ✓ Our study also demonstrates the high risk of thrombosis in patients with PSA.
- ✓ UGT treatment reduces new onset of DVT after PSA-therapy by more than 50%, compared with the PPB-therapy.
- ✓ Therefore DVT screening after PSA treatment is recommended for both legs.
- ✓ The distribution of medication shows, that UGT can be performed successfully at patients with heparin or phenprocoumon medication