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Introduction

Persistent withdrawal occlusion (PWO) is a specific catheter malfunction characterized by the inability to withdraw blood through the device. The most common cause of PWO in ports is the presence of a fibroblastic sleeve (FS). Malfunction may lead to incorrect administration of medication with increased risk of complications.

Methods

A total of 177 cases of PWO in venous ports were managed. The patients underwent fluoroscopy with a contrast agent administration. Mechanical disruption with a syringe of saline using the flush method was used; in case of its failure, subsequent administration of a lock solution with taurolidine and urokinase or low-dose thrombolysis with alteplase were indicated. Demographic data were compared with a control group.

Results

A significantly higher proportion of female patients was found in the cohort of patients with PWO (80.3% vs 66.3%, $p = 0.004$), dominantly patients with ovarian cancer (12.8% vs 4.8%, $p = 0.022$). No effect of the cannulated vein or the type of treatment on the incidence of PWO was demonstrated. The presence of FS was verified in 70% of cases. Mechanical disruption with a syringe was successful in 53.5% of cases. A significantly shorter time to referral (3 weeks, $p = 0.006$) was demonstrated with successful management. The overall success rate of patency restoration by mechanical disruption alone or in combination with a thrombolytic (urokinase or alteplase) administration was 97.4%.

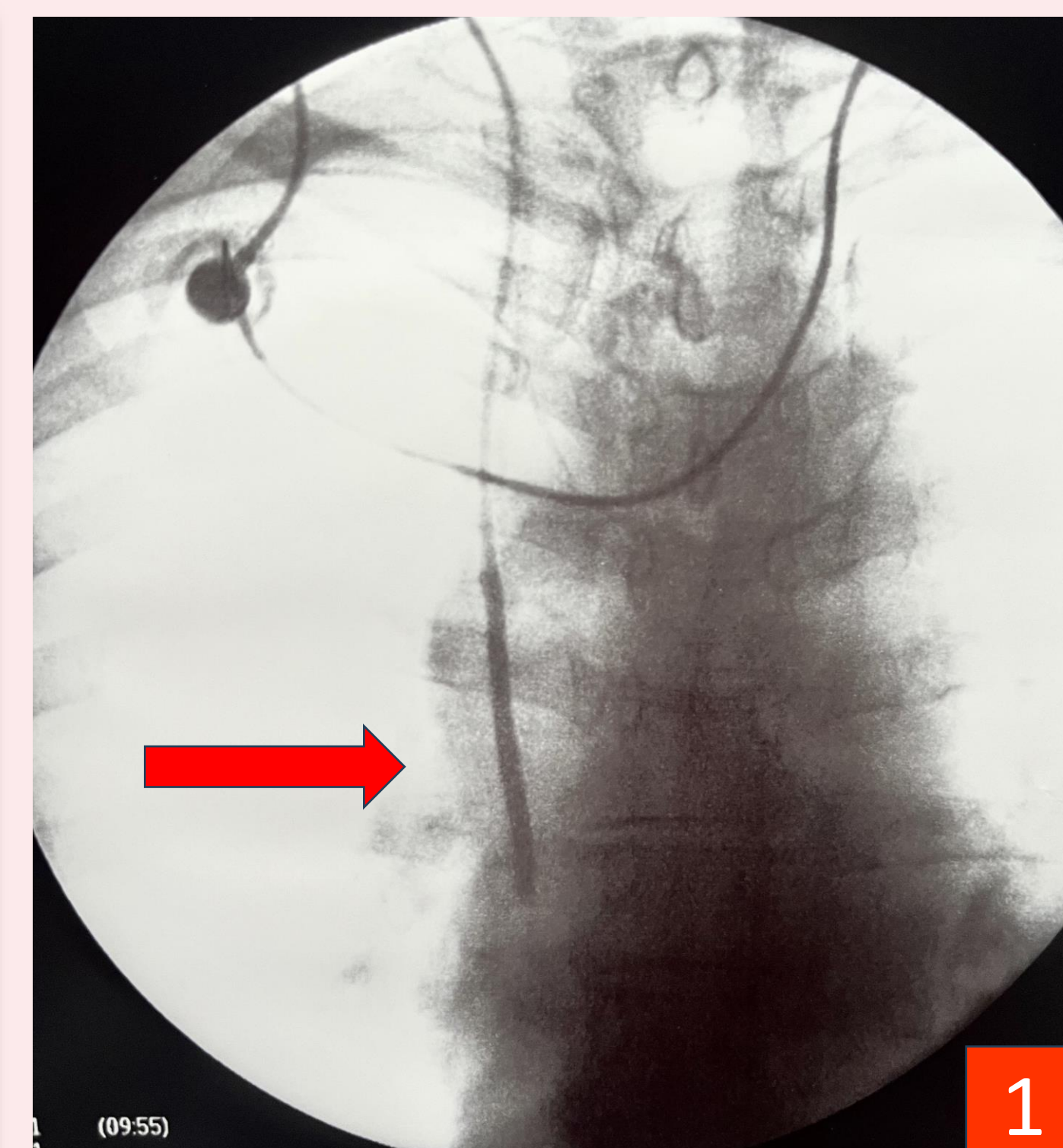


Fig. 1. Fluoroscopy – fibroblastic sleeve (FS)

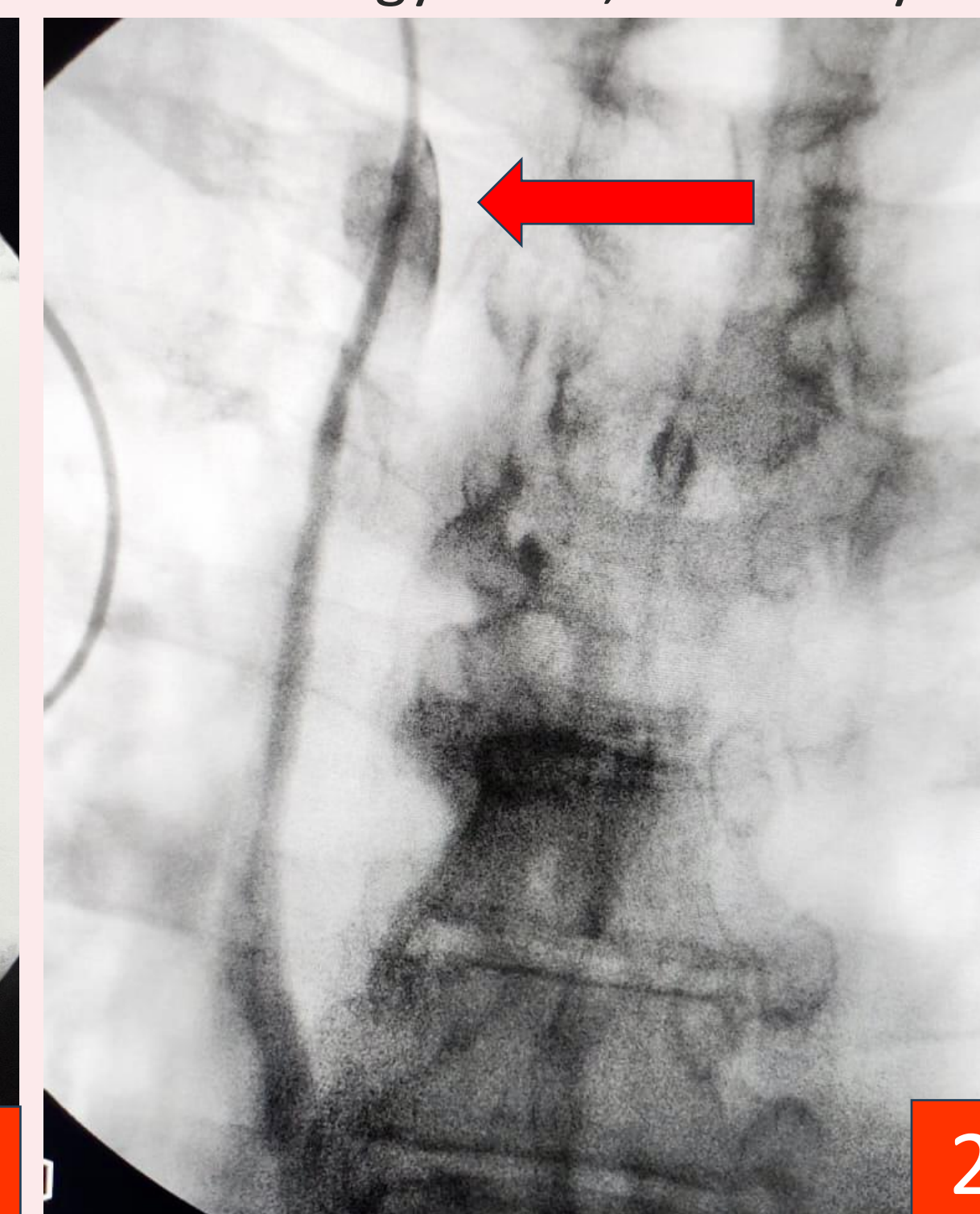


Fig. 2. FS with false route of the contrast agent



Fig. 3. FS on the catheter

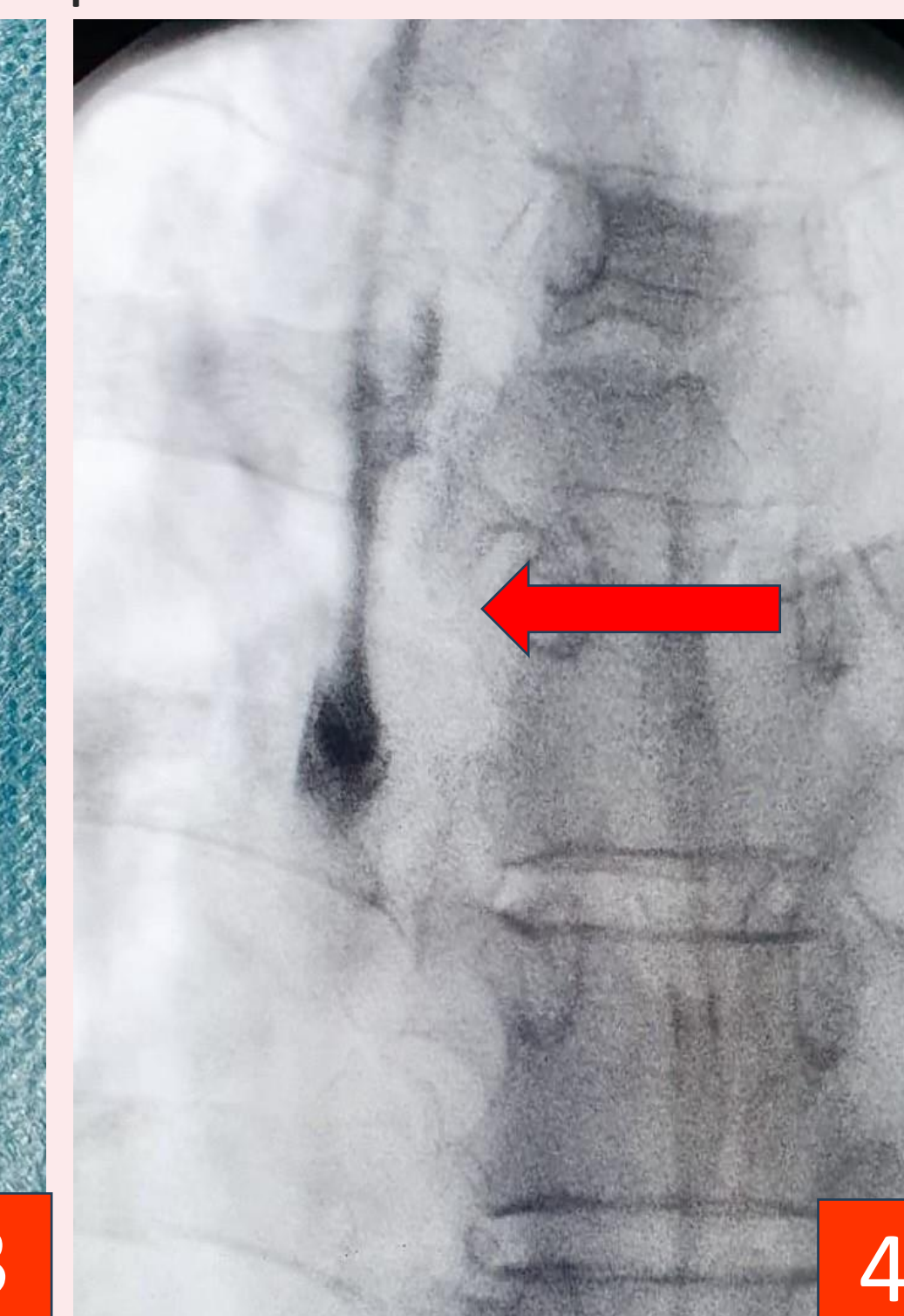


Fig. 4. FS combined with a thrombus

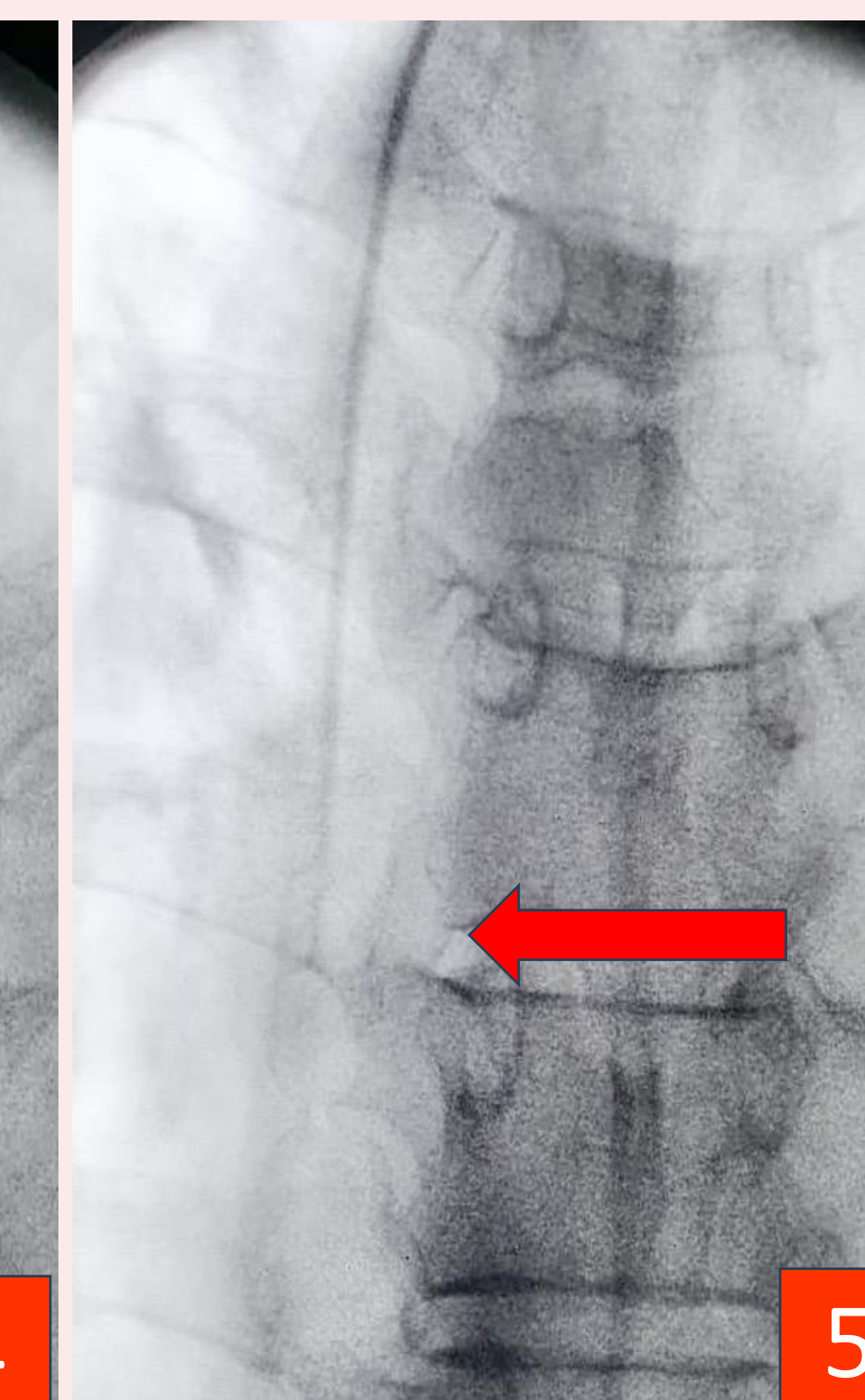


Fig. 5. The same case as in Fig. 4, after alteplase

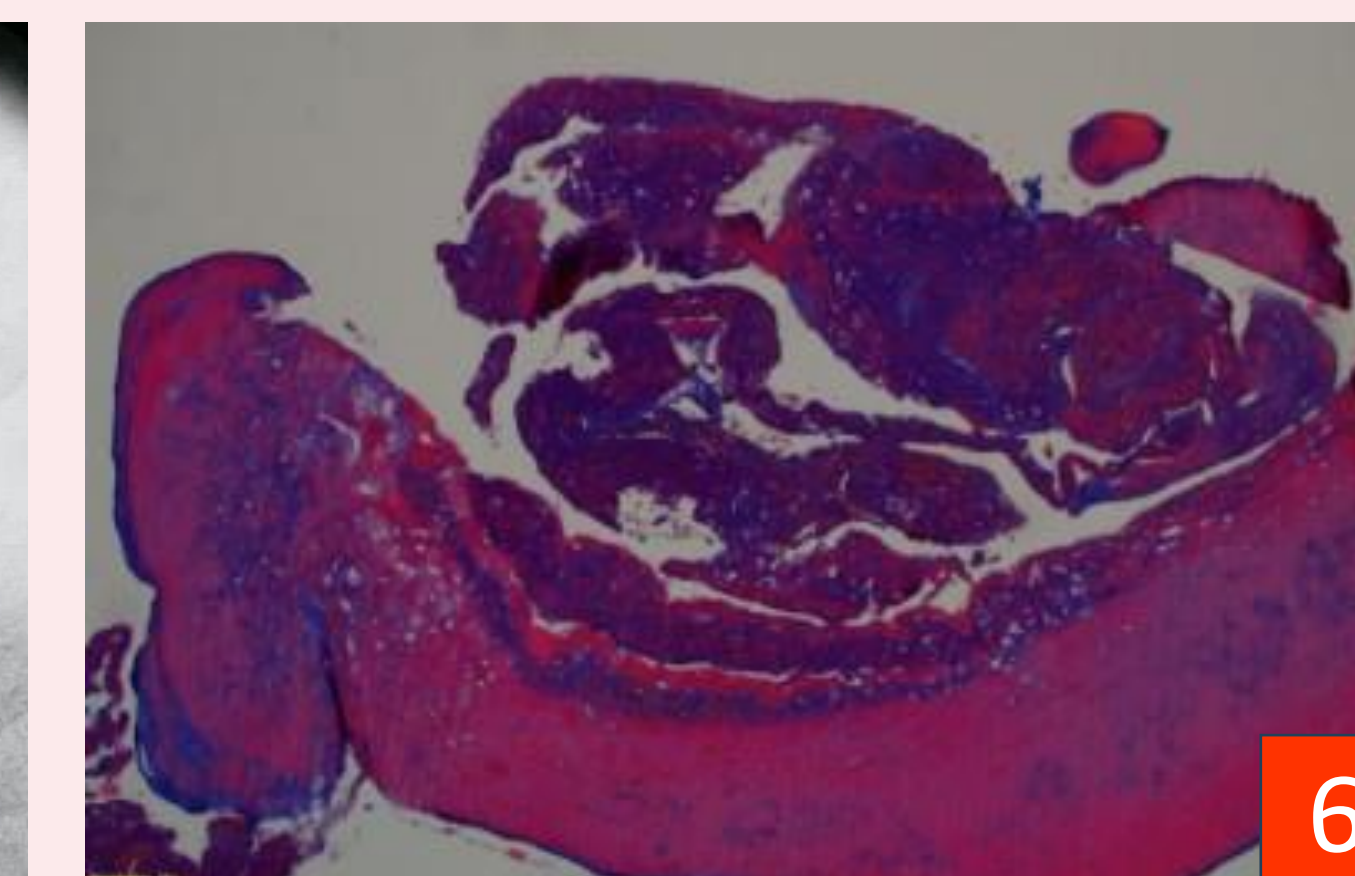
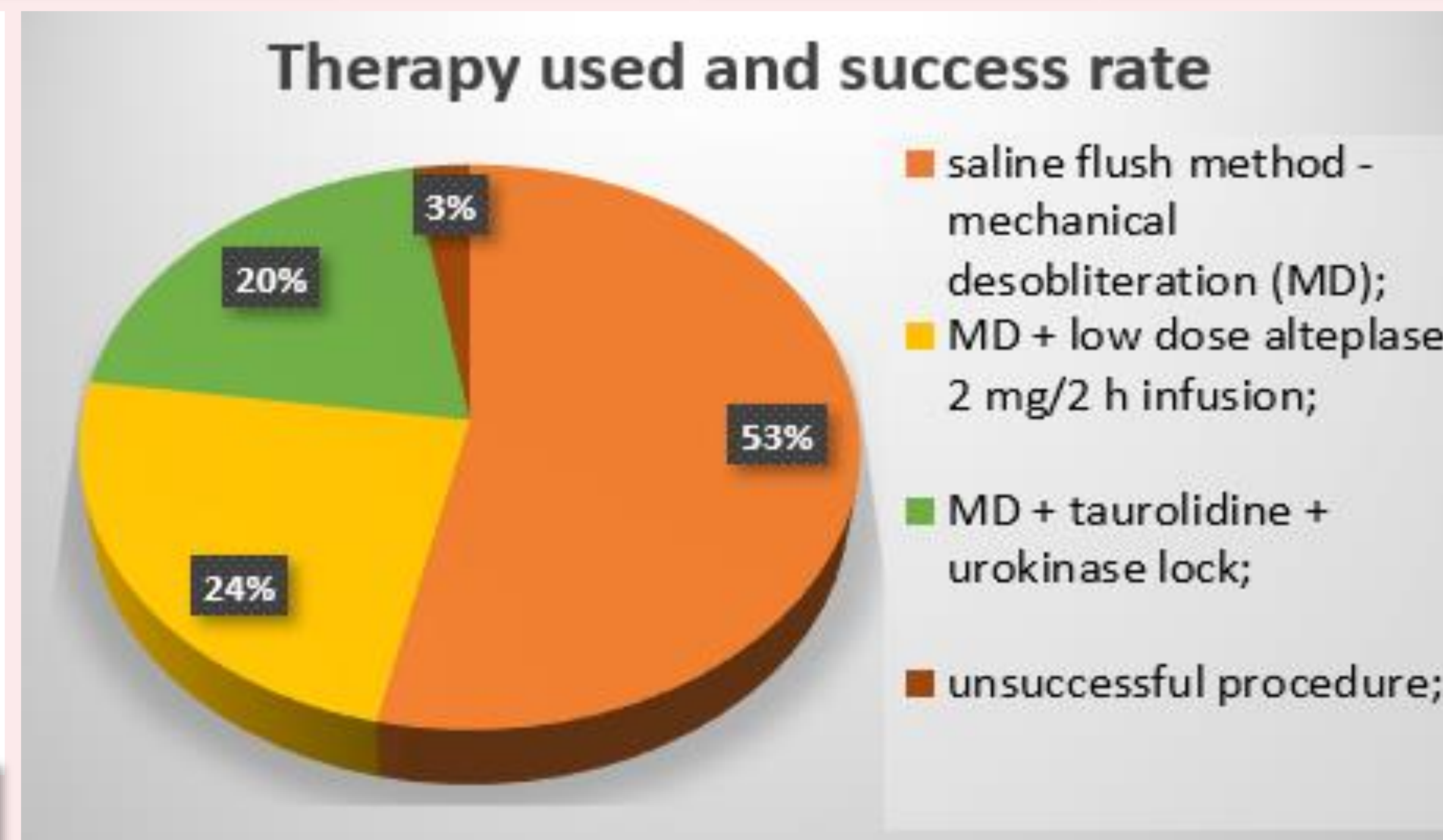


Fig. 6. FS with the presence of a thrombus - histopathological image (Carstairs staining, 100x magnification)

	PWO group	Control non-PWO group	p
No. of patients	117	398	-
Sex M/F	23/94 (19.7%/80.3%)	134/264 (33.7%/66.3%)	0.004
Age median (min-max)	60.0 (21-79)	60.0 (21-80)	0.681
diagnosis			
colorectal cancer	32 (27.4%)	116 (29.0%)	0.022
breast cancer	42 (35.9%)	162 (40.5%)	
ovarian cancer	15 (12.8%)	19 (4.8%)	
other diagnoses	28 (23.9%)	103 (25.8%)	
cannulation side			
right	75 (64.1%)	274 (68.5%)	0.372
left	42 (35.9%)	126 (31.5%)	
cannulated vein			
internal jugular vein	92 (79.3%)	323 (80.8%)	0.103
axillary vein	17 (14.7%)	65 (16.3%)	
subclavian vein	5 (4.3%)	12 (3.0%)	
cephalic vein	2 (1.7%)	0 (0.0%)	

Study and control groups characteristics



Conclusions

We created a method for managing PWO using mechanical disruption +/- application of thrombolytics with a 97.4% success rate. If the patient is referred for management sooner, there is a higher chance of restoring the port function by mechanical disruption using a smaller volume of saline. Current evidence showed that the fibroblastic sleeve is not likely to be affected by thrombolytic drugs; however, we have ascertained an effect of these drugs, proposing a hypothesis of microthrombotic events at the tip of the catheter if FS is present. The examination of an FS specimen obtained after the catheter was pulled out supports this hypothesis.

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