
Grand Rounds
Rigshospitalet
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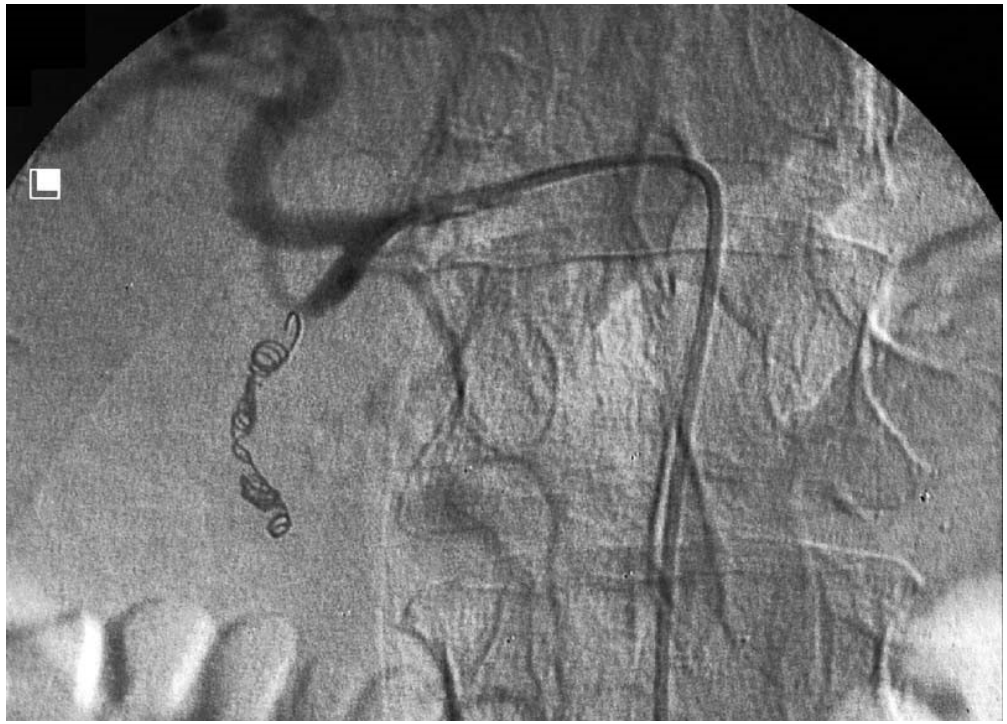
Rigshospitalet
Diagnostisk Center

Grand Round om embolisering

Susanne Frevert, overlæge, Rigshospitalet

Procedure: Embolisering

- Definition:
  - Terapeutisk placering af materiale i blodårene mhp. at okkludere dem.



1904
Dawbarn

Første embolisering

1953
Seldinger

Beskrivelse af percutan adgang til kar

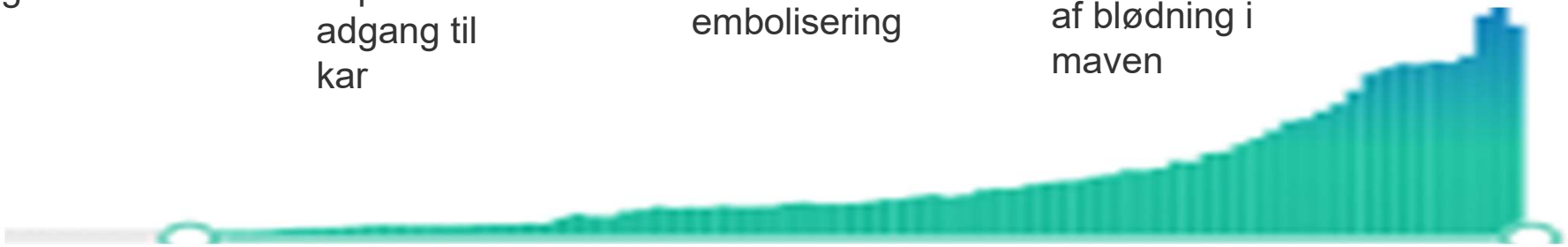
1960-1970
Luessenhop
Doppman
Djindjin

Første perkutane embolisering

1972
Rösch

Første embolisering af blødning i maven

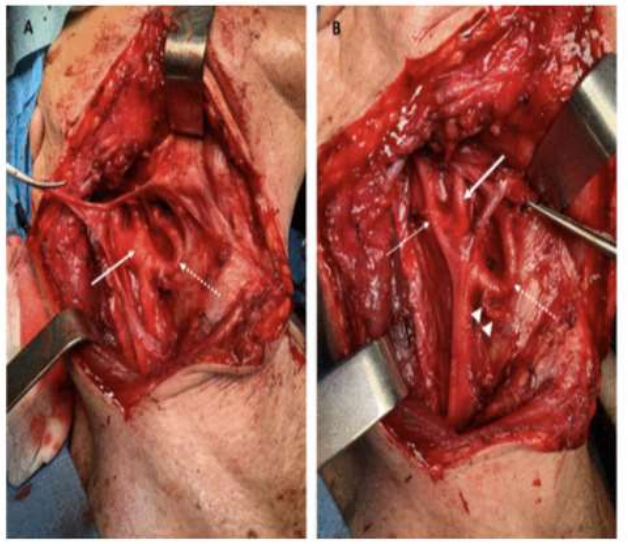
Ca. 4.000 publikationer i 2022

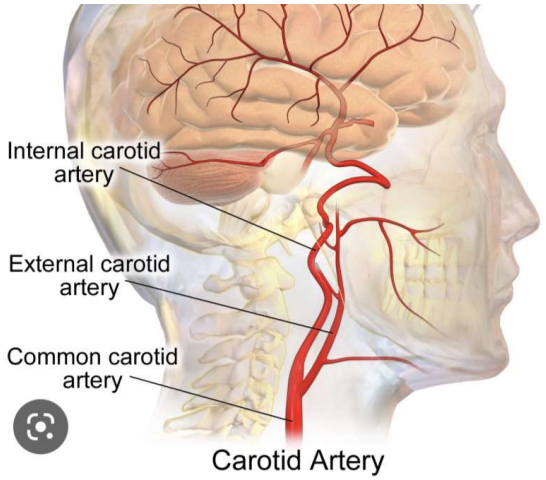


Historie - 1904

- Amerikansk kirurg R.H.M Dawbarn (1860-1915)
  - Inoperable hoved/halscancer
  - Beskrev injektion af 1 del hvid parafin/9 dele hvid vaselineblanding ved direkte inj. i frilagt A. carotis externa.
  - Kan inj. ved 49°C, størkner ved 42°C.
  - Patienterne oplevede reduktion af tumor og smertelindring

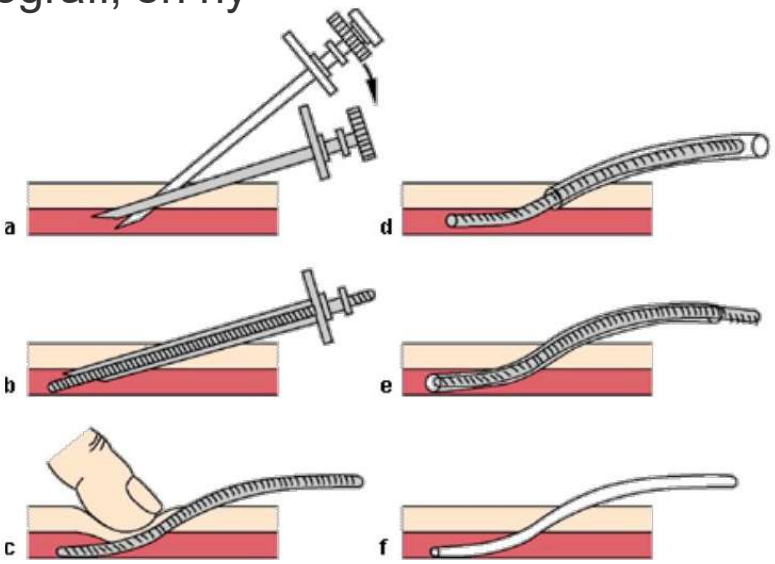
Bruges nu mest som skopudsemiddel





Historie - 1953

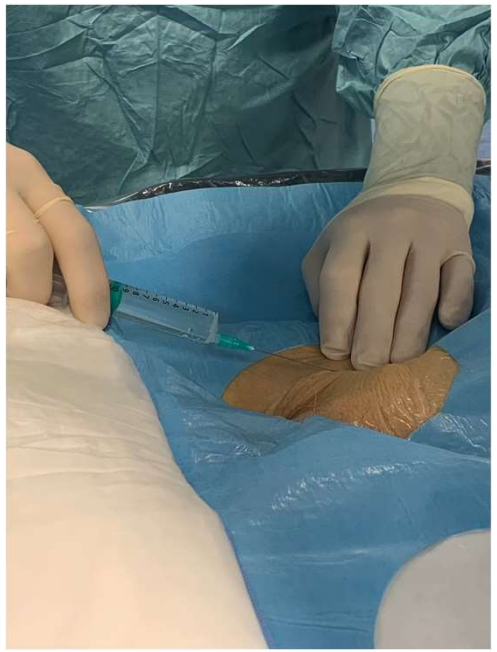
- Svensk radiolog: S. I. Seldinger (1921-1998)
  - Placering af kateter i blodkar mhp. arteriografi, en ny teknik



May 1953, acta radiologica

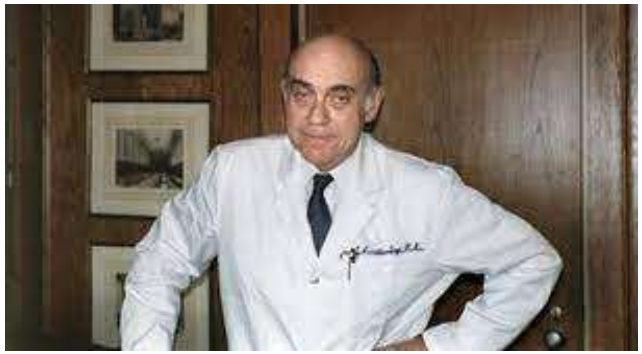
Seldinger teknik

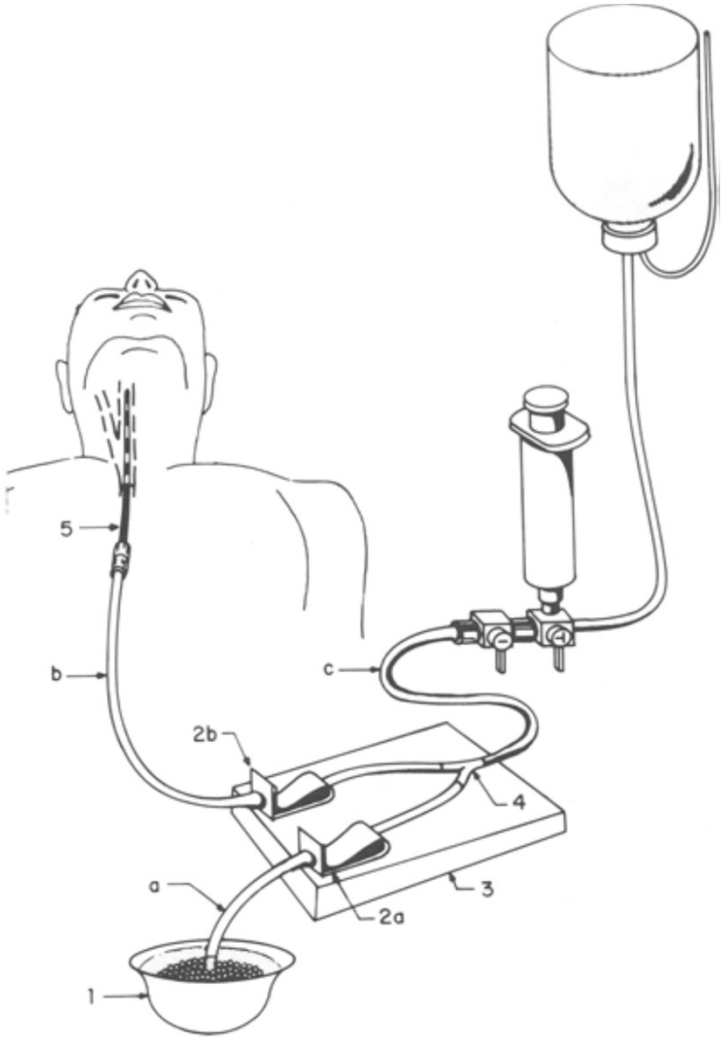
1. Lokal anæstesi
2. Pkt. med kanyle, når pulserende blod
3. Indføres guide wire
4. Nål fjernes under kompression
5. Kateter føres ind over guide wire.



Historie - 1960

- Amerikansk neurokirurg
- A. J. Luessenhop (1926-2009)
  - *Artificial embolisation of cerebral arteries*. Report af metoden i en arteriovenøs malformation.

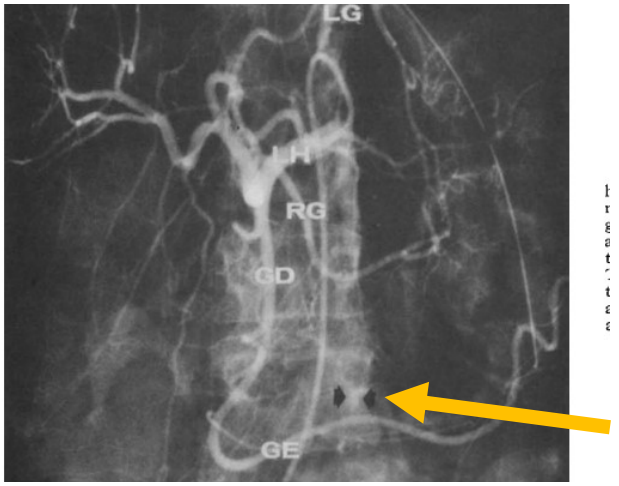


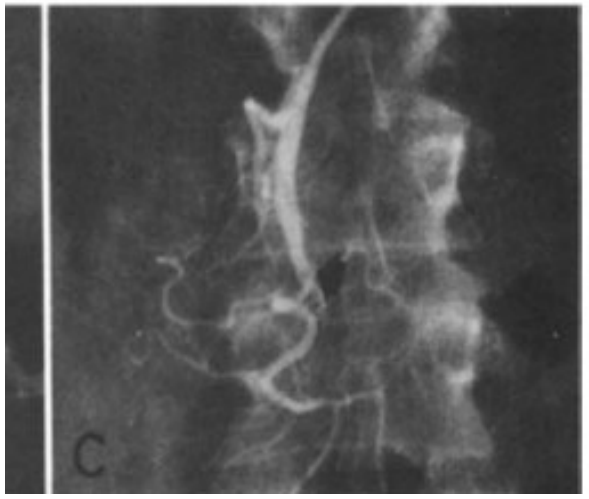


JAMA 1960;172:1153-1155

Historie - 1972

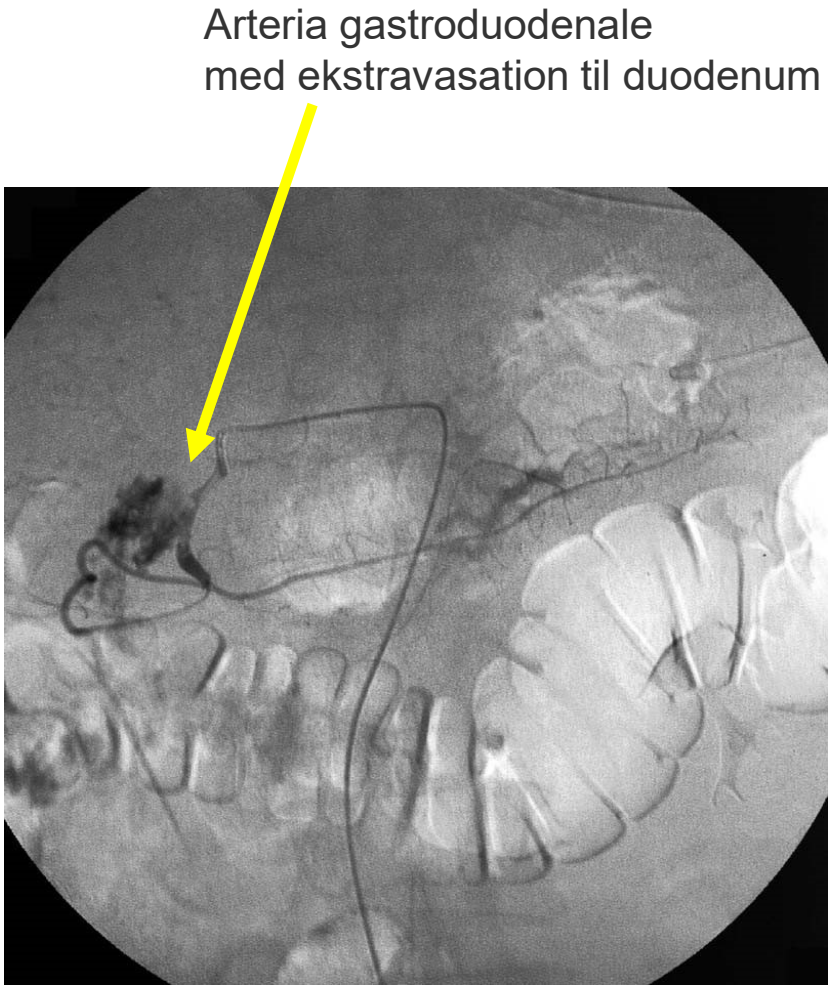
- J. Rösch (1925-2016)
  - Selektiv arteriel embolisering
  - Svært comorbid yngre patient med gastrointestinal blødning.
  - Emboliseret med injektion af koaguleret blod.
  - Blødningen stoppet



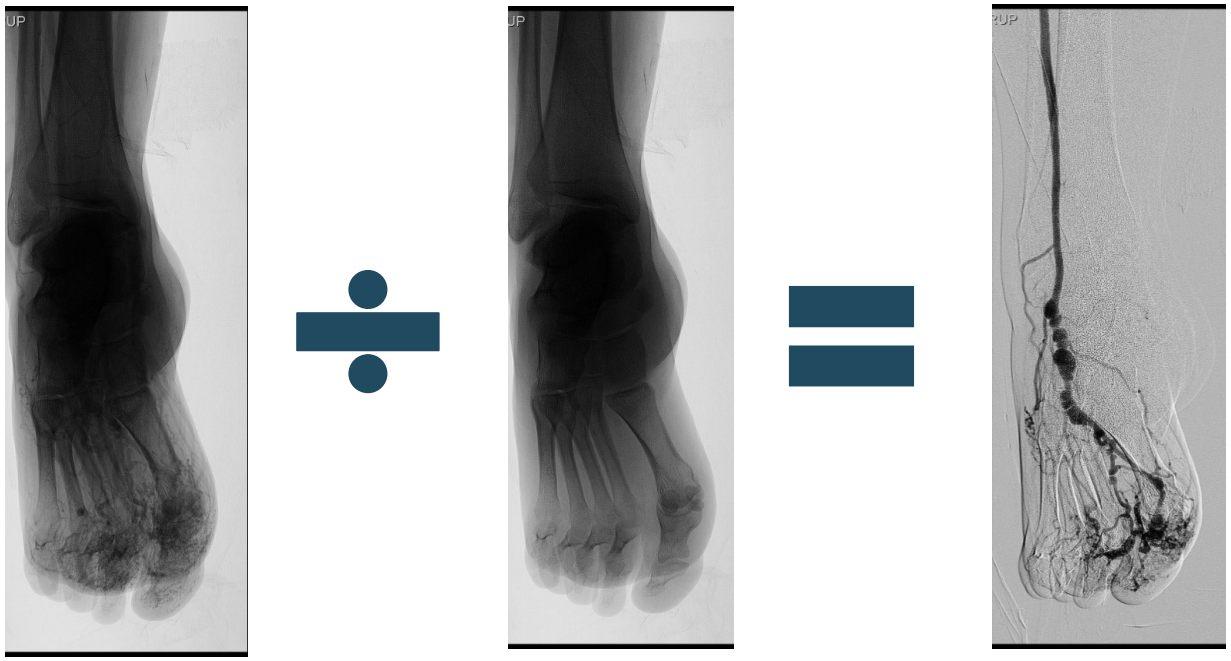


1970’ erne

- Digital subtraktions-arteriografi
  - Betydelig bedre billedkvalitet med flere detaljer.

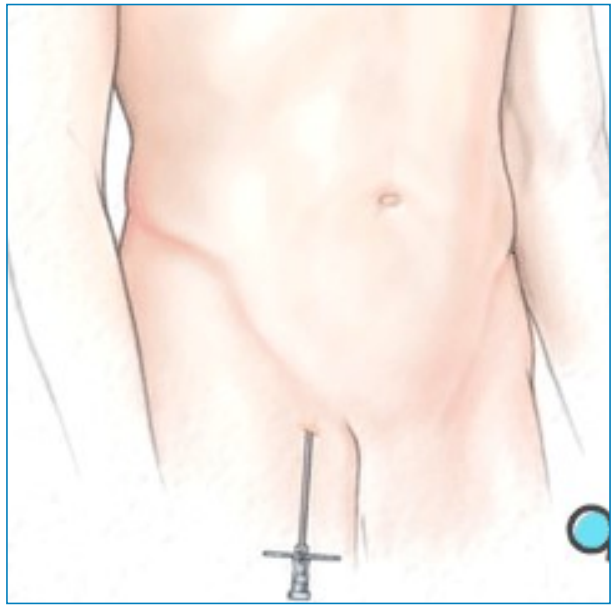


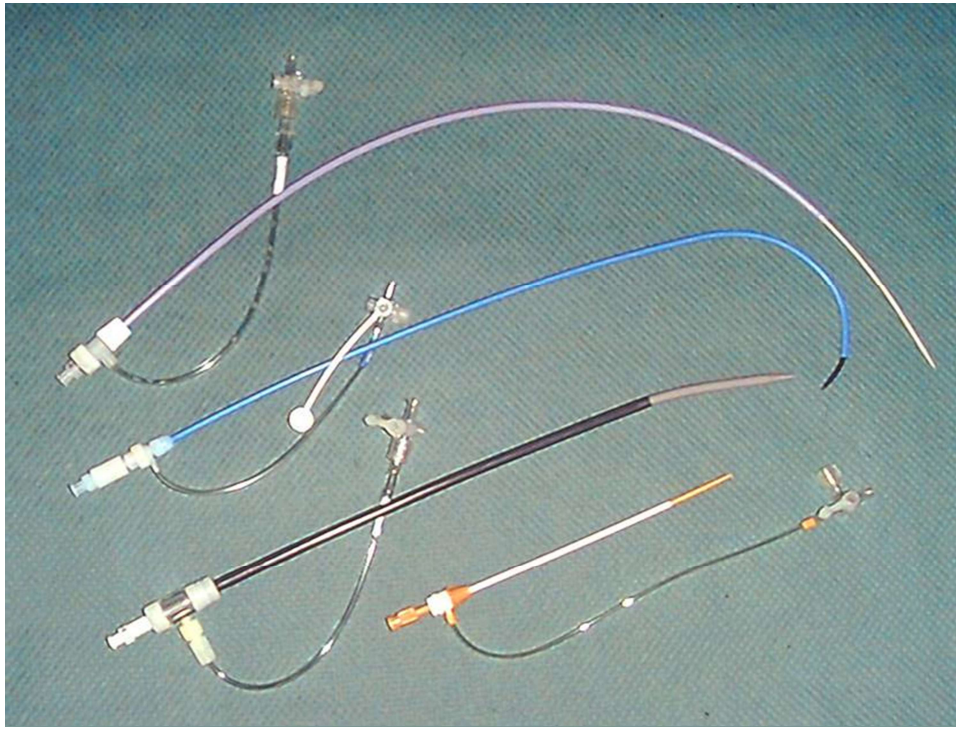
Billede – maske = subtraktionsangiografi.



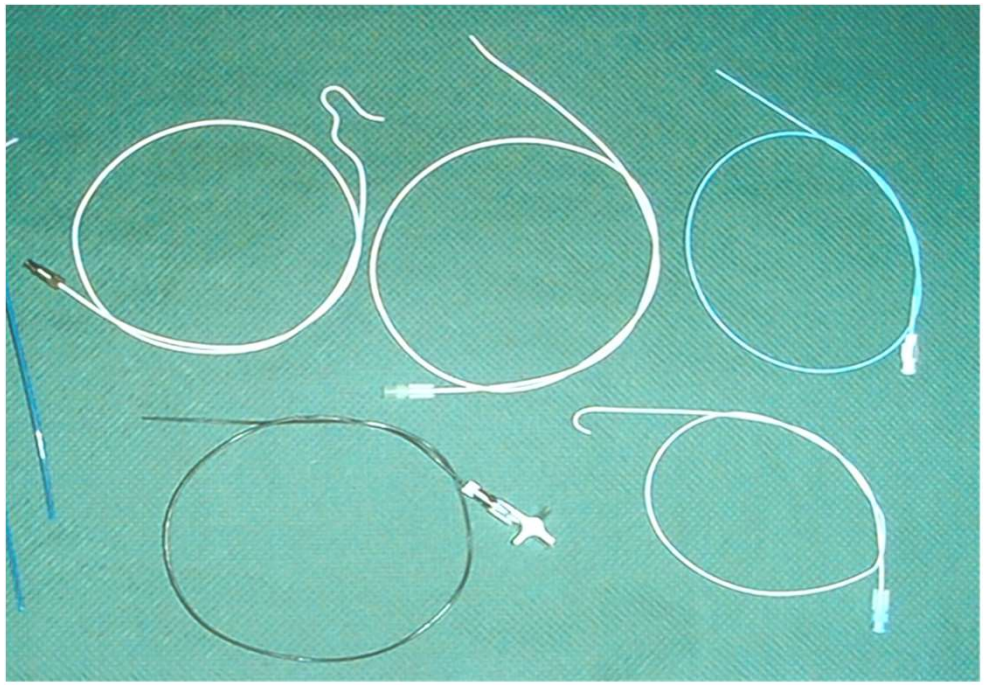
Fod med arteriovenøs malformation

Hele kroppens arteriosystem kan nås fra lysken

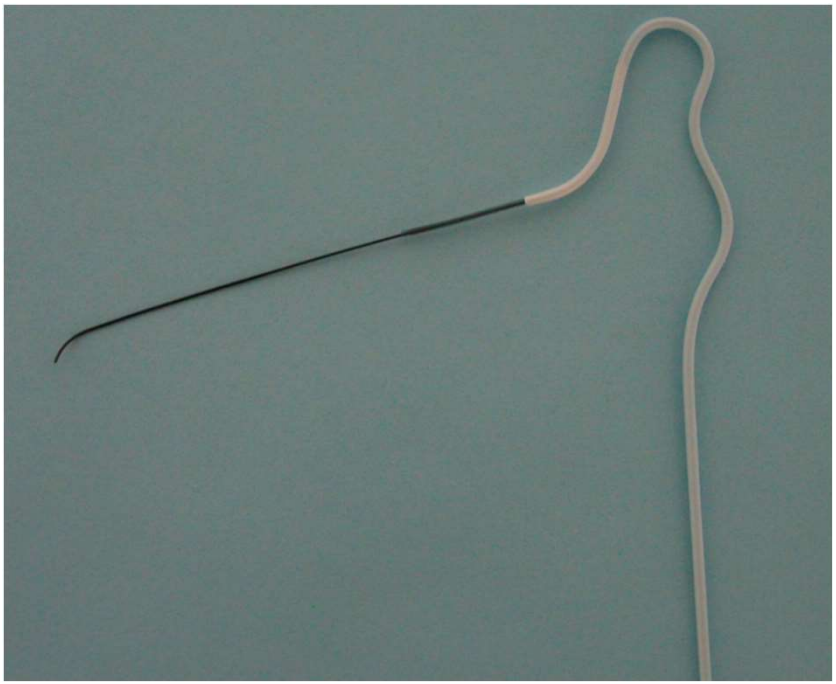




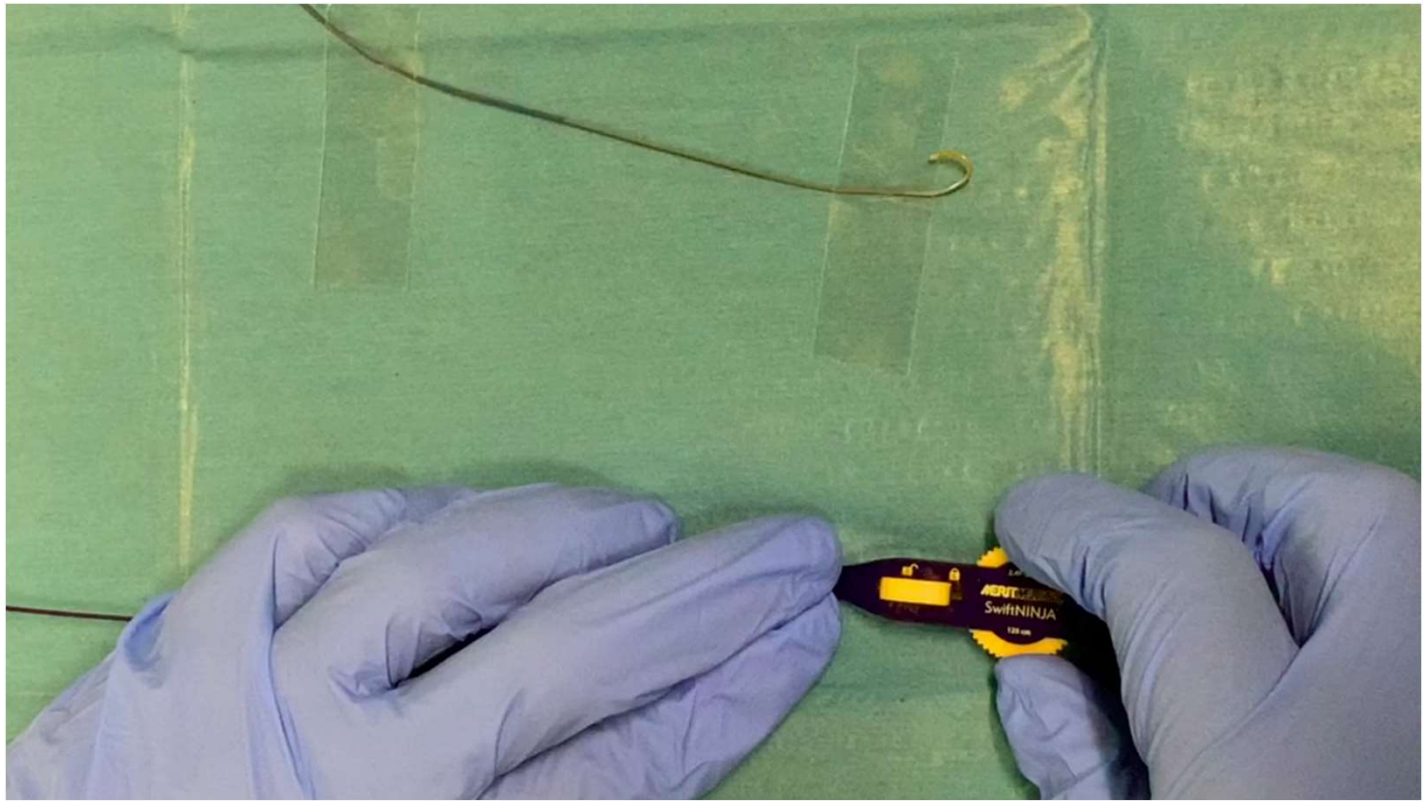
Diagnostiske katetre 4-5 fr.



Microkatetre ca. 2,4 fr.



SwiftNINJA microkateter < 1 mm

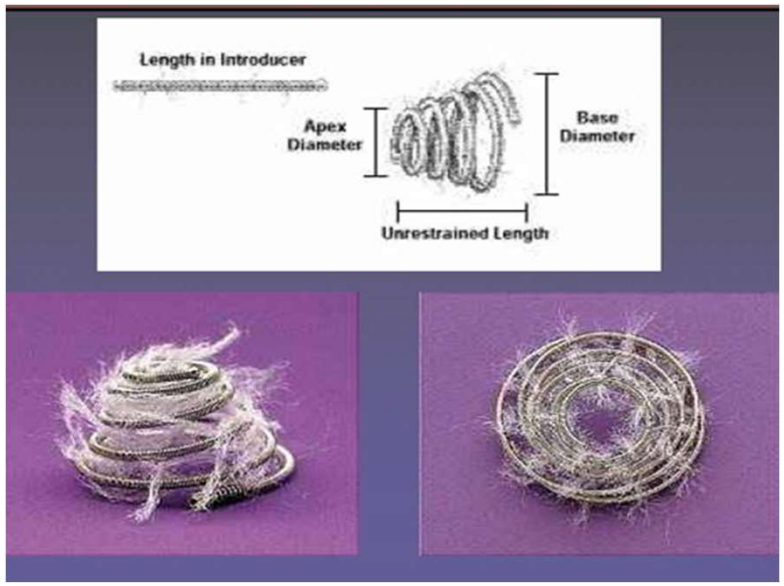


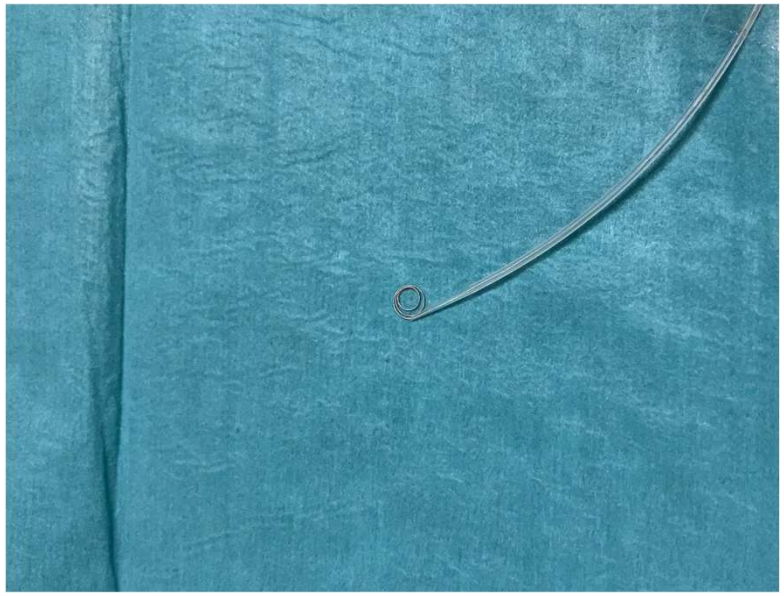
Emboliseringsmaterialer

- Coils
- Spongostan
- Flydende
  - Lim, Onyx, absolut alcohol
- Partikler

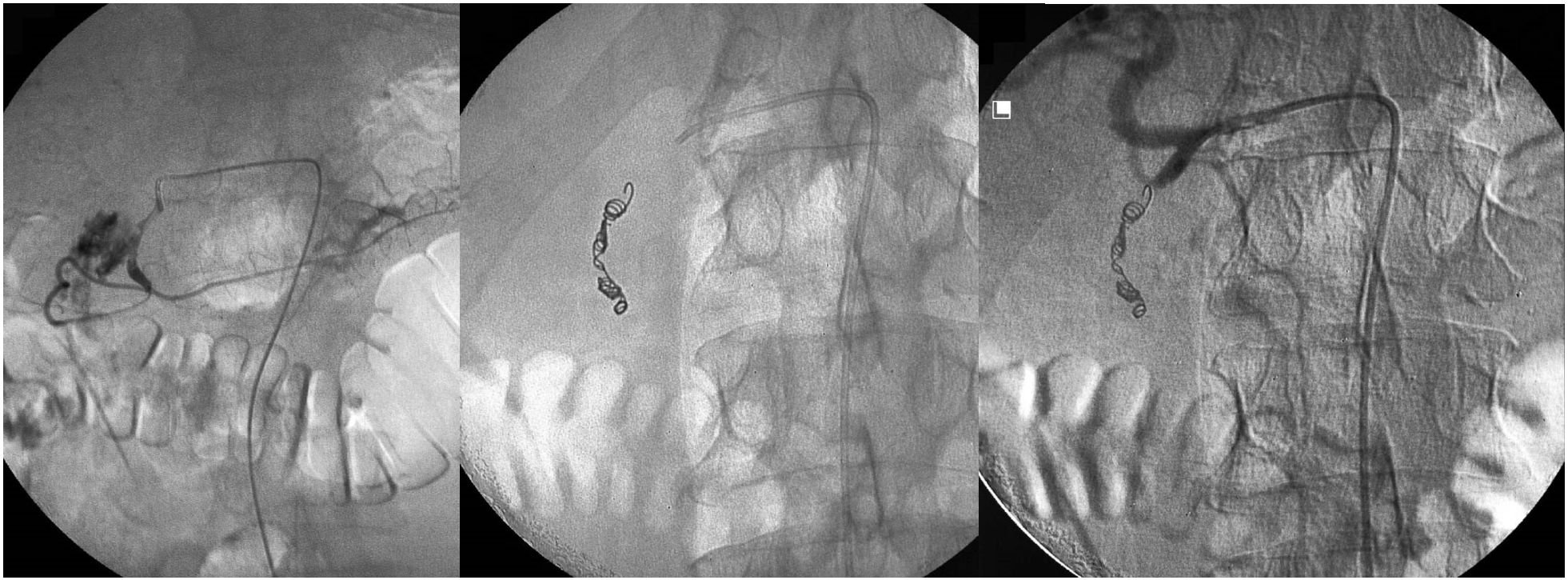
Materialer

- Metal
  - Rustfrit stål
  - Platin

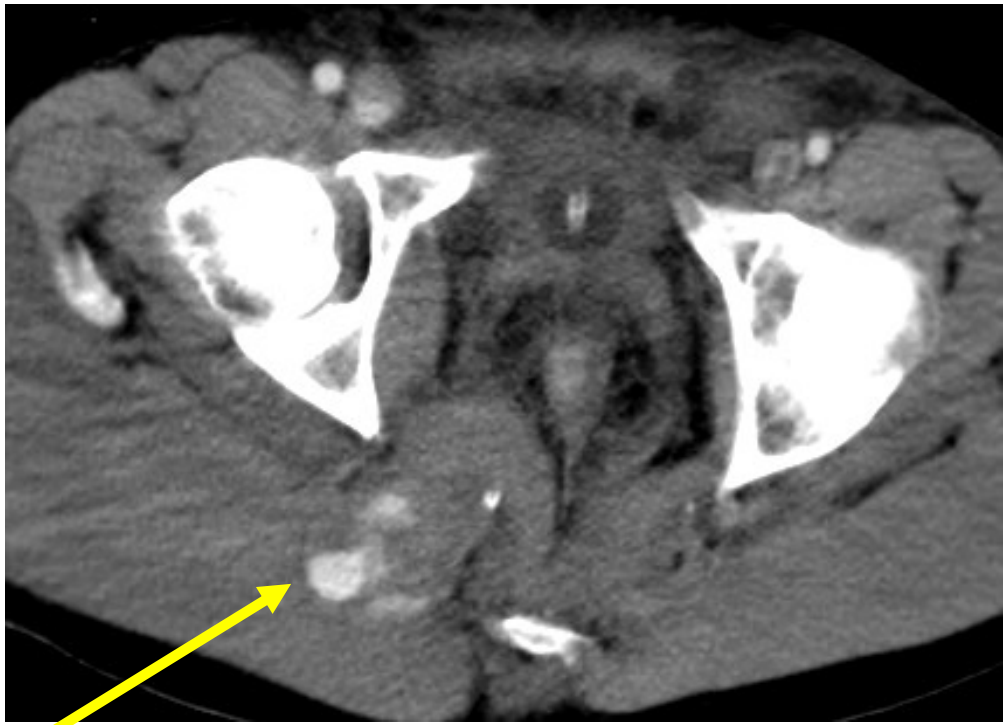




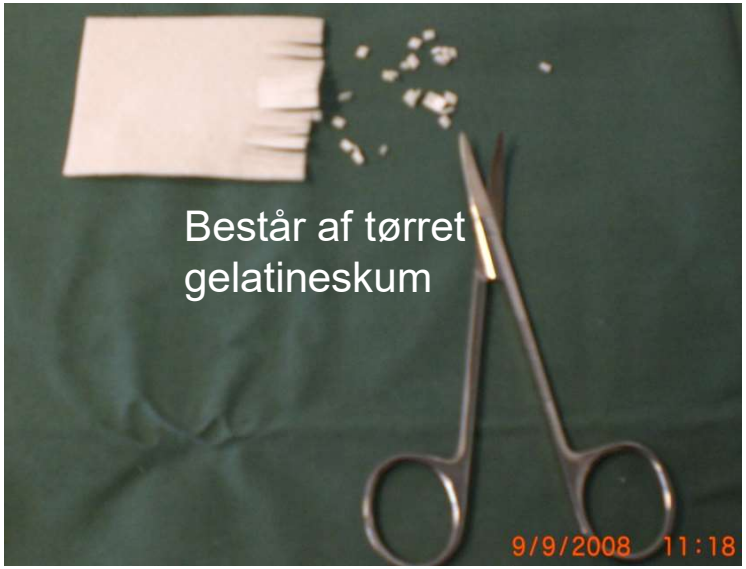
A. Gastroduodenal blødning

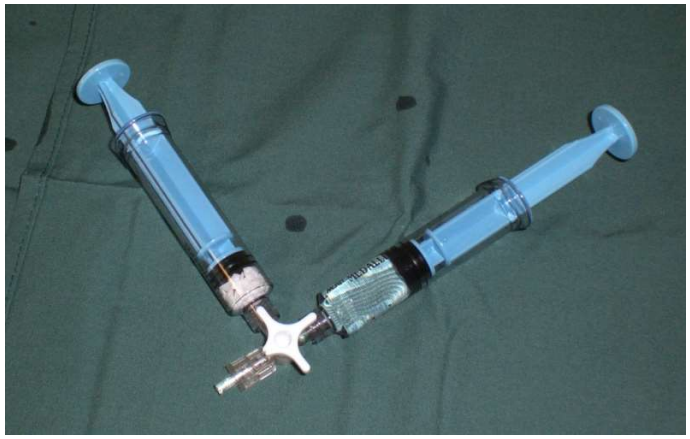


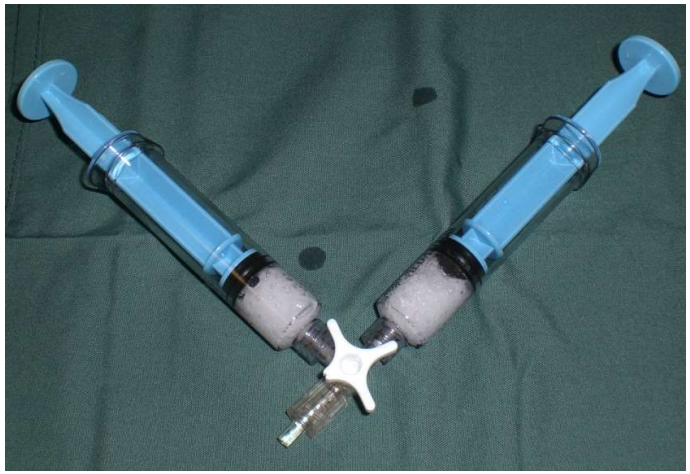
Motorcykelulykke



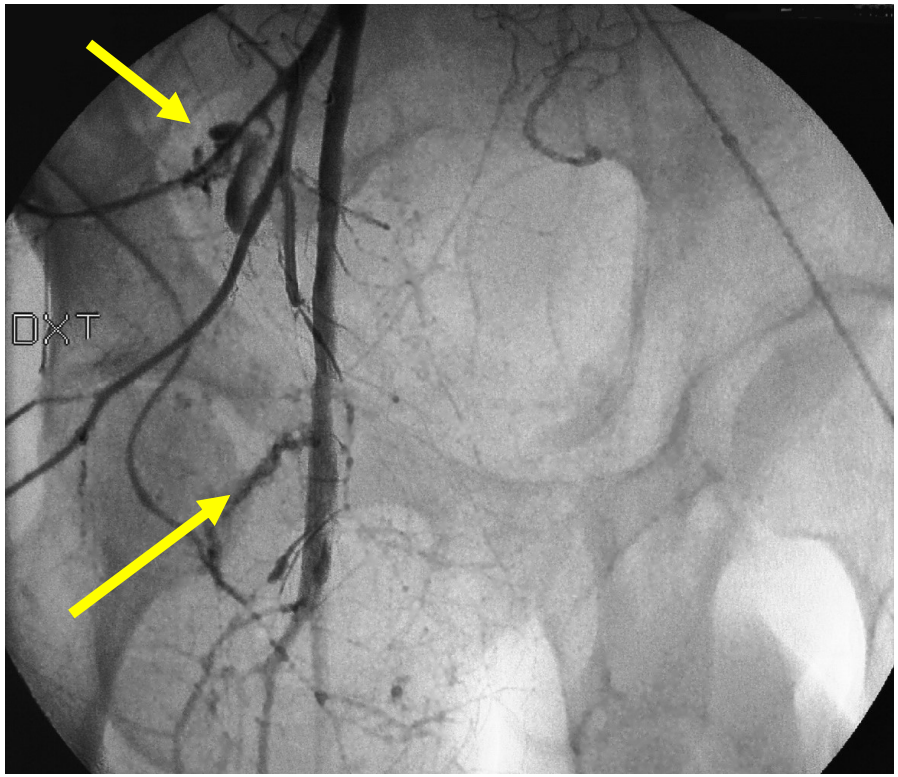
Gel foam/Spongostan

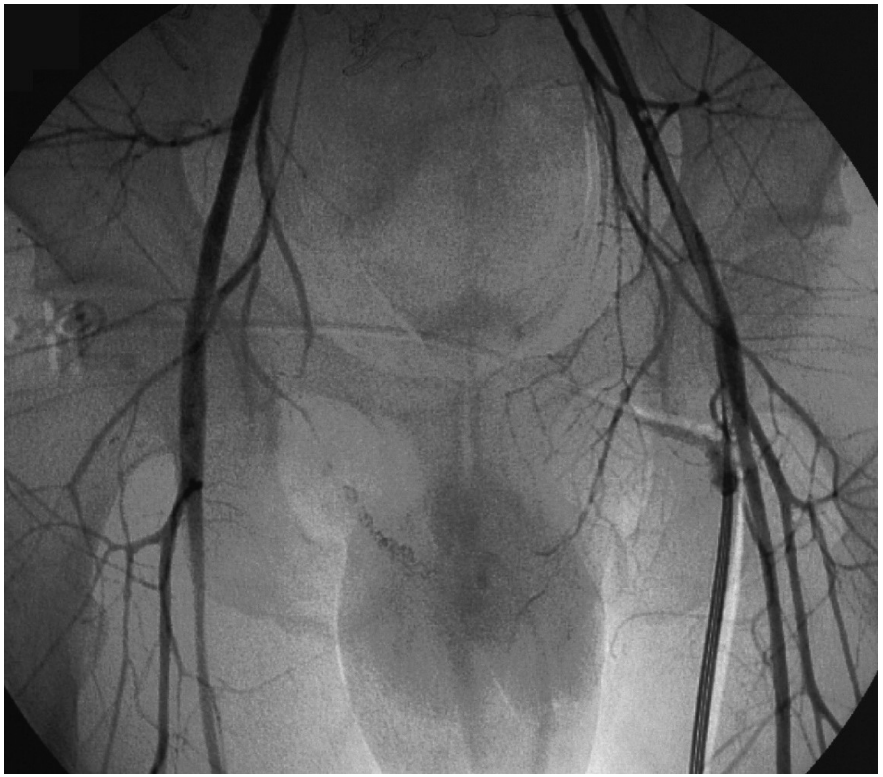






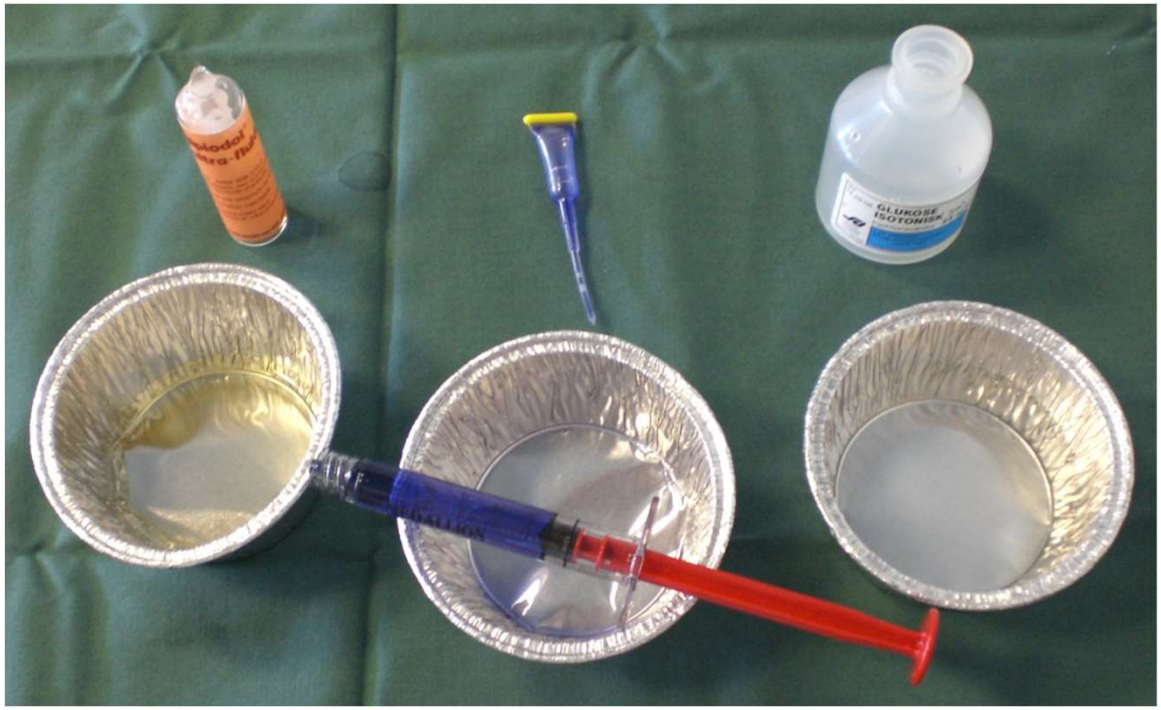
Gel foam/Spongostan



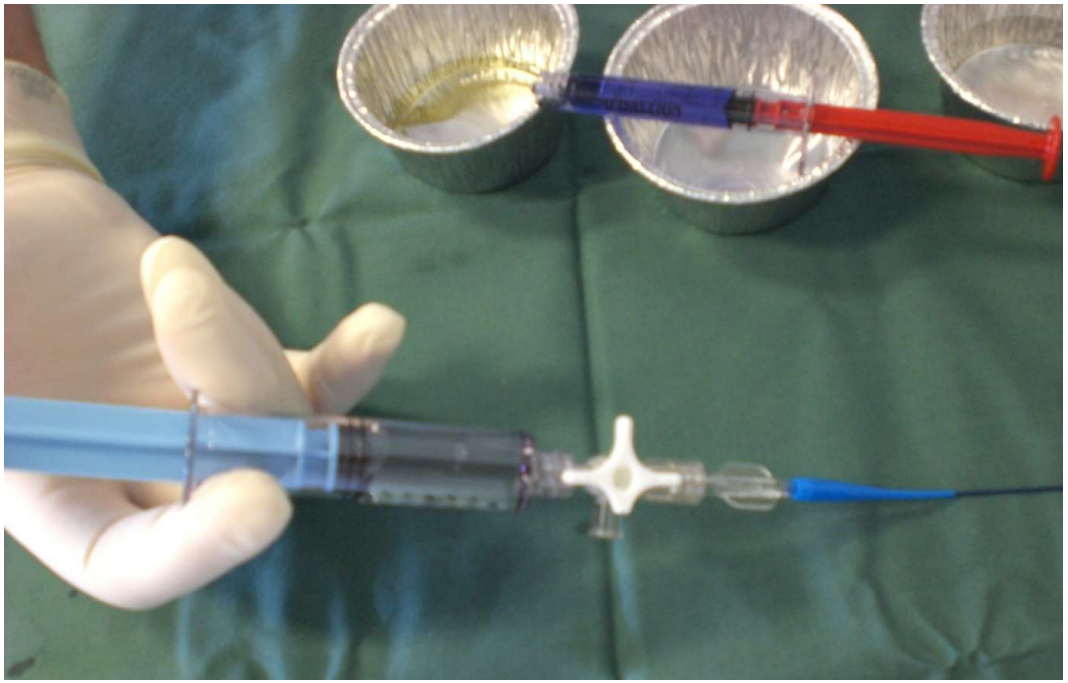


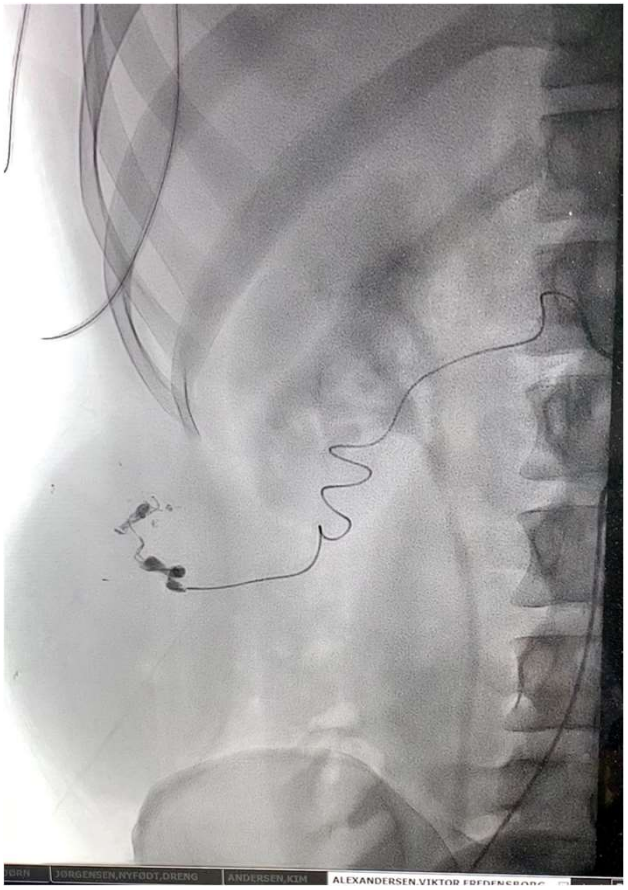
Histoacryl - Lim

- Histoacryl størkner når ved kontakt med frie ioner fx. i blod
- Blandes med Lipiodol, der forsinker processen – dosisafhængig



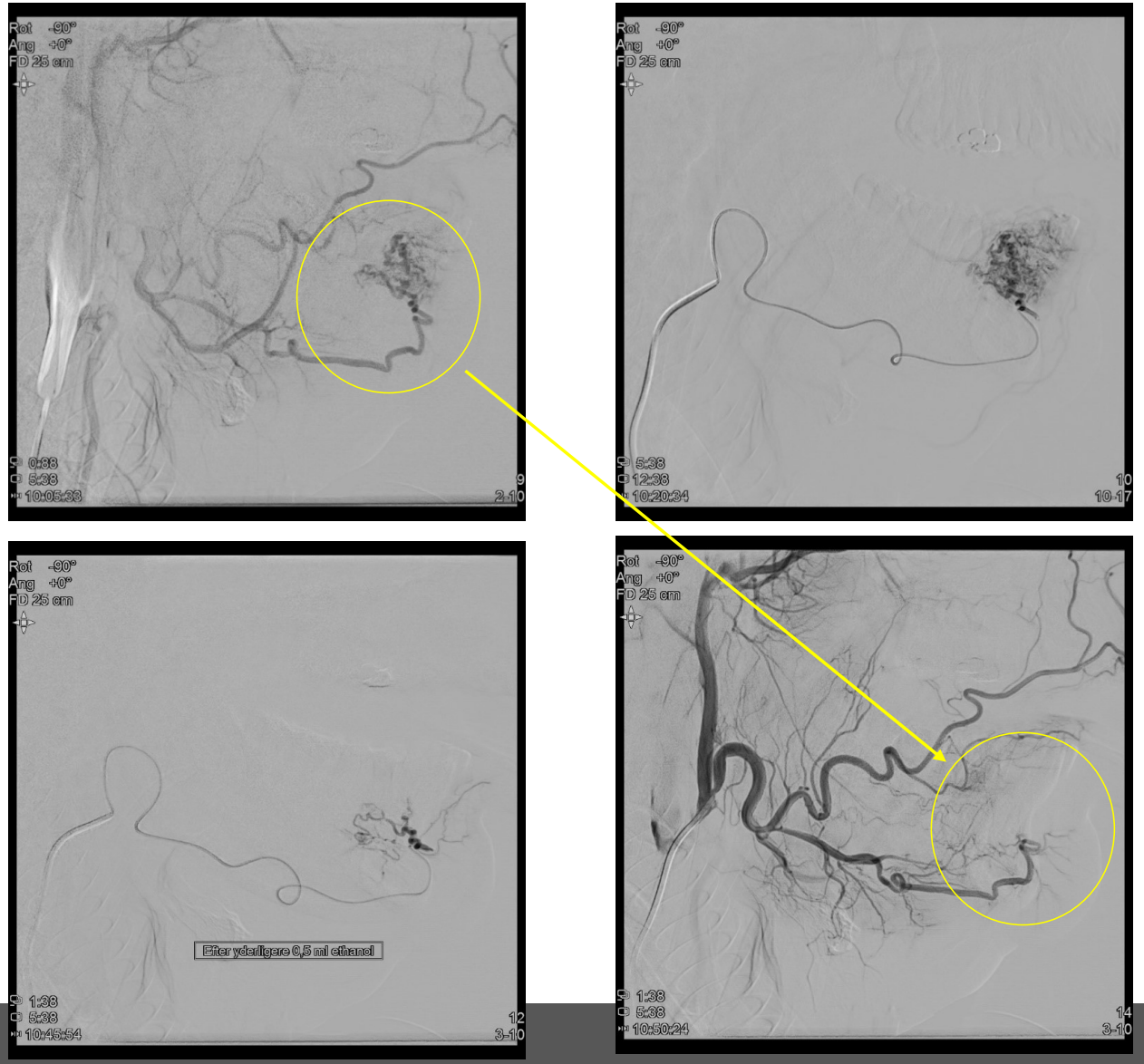
Alt skal skylles med sukkervand





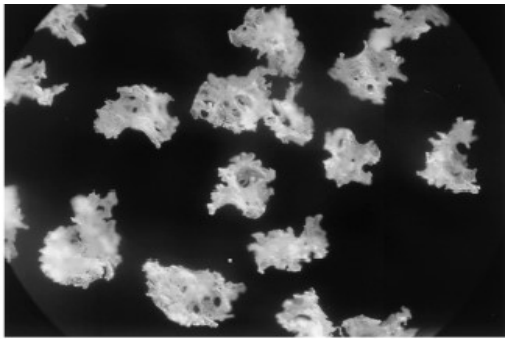
Absolut alkohol

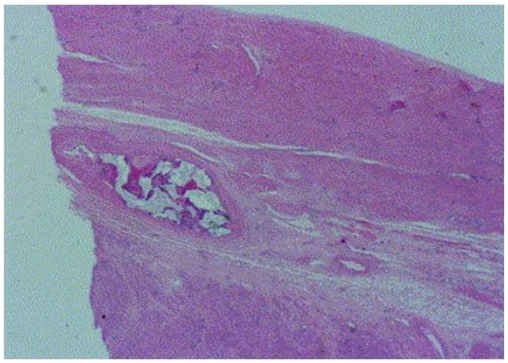
- Flydende emboliseringsmateriale.
- Når meget langt ud i de allermindste kar
- AVM behandlet med 0,3 ml + 0,5 ml alkohol



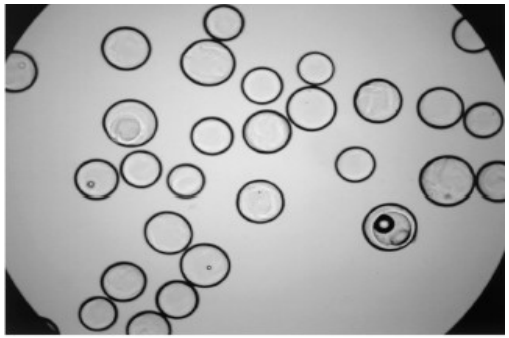
Partikler

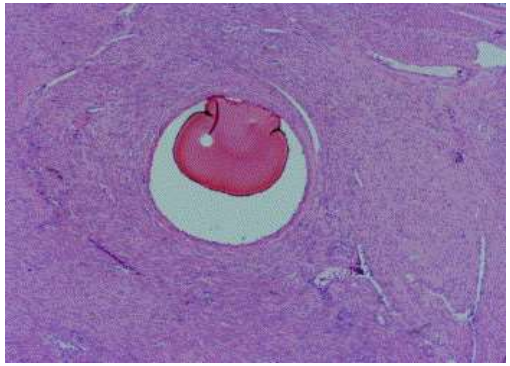
Non sfæriske



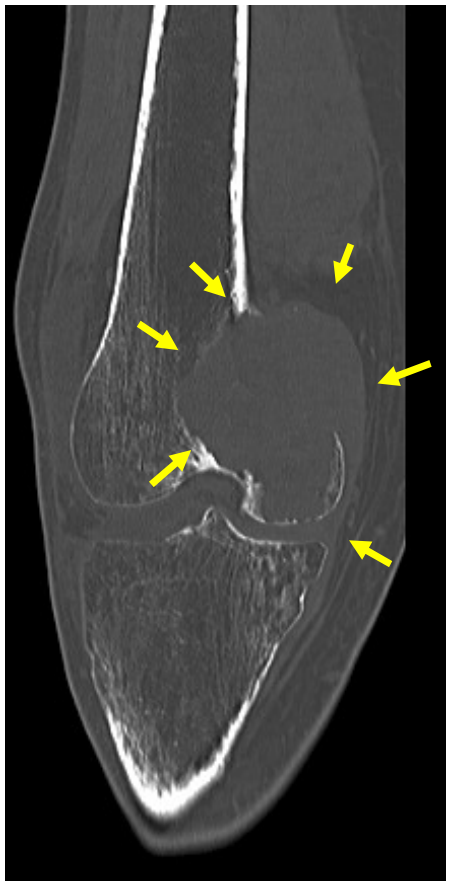


Sfæriske

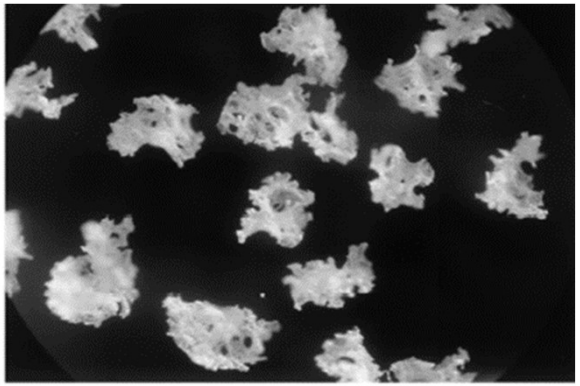


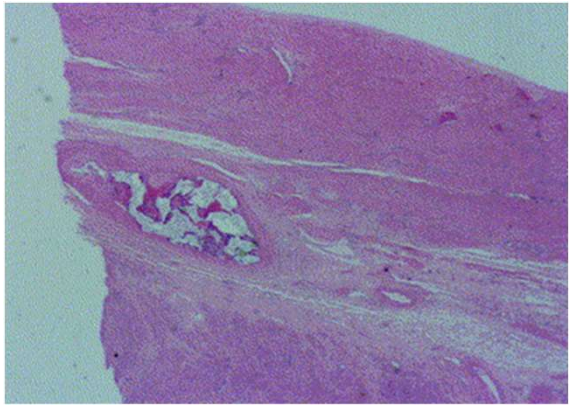


Renal celle carcinom metastase

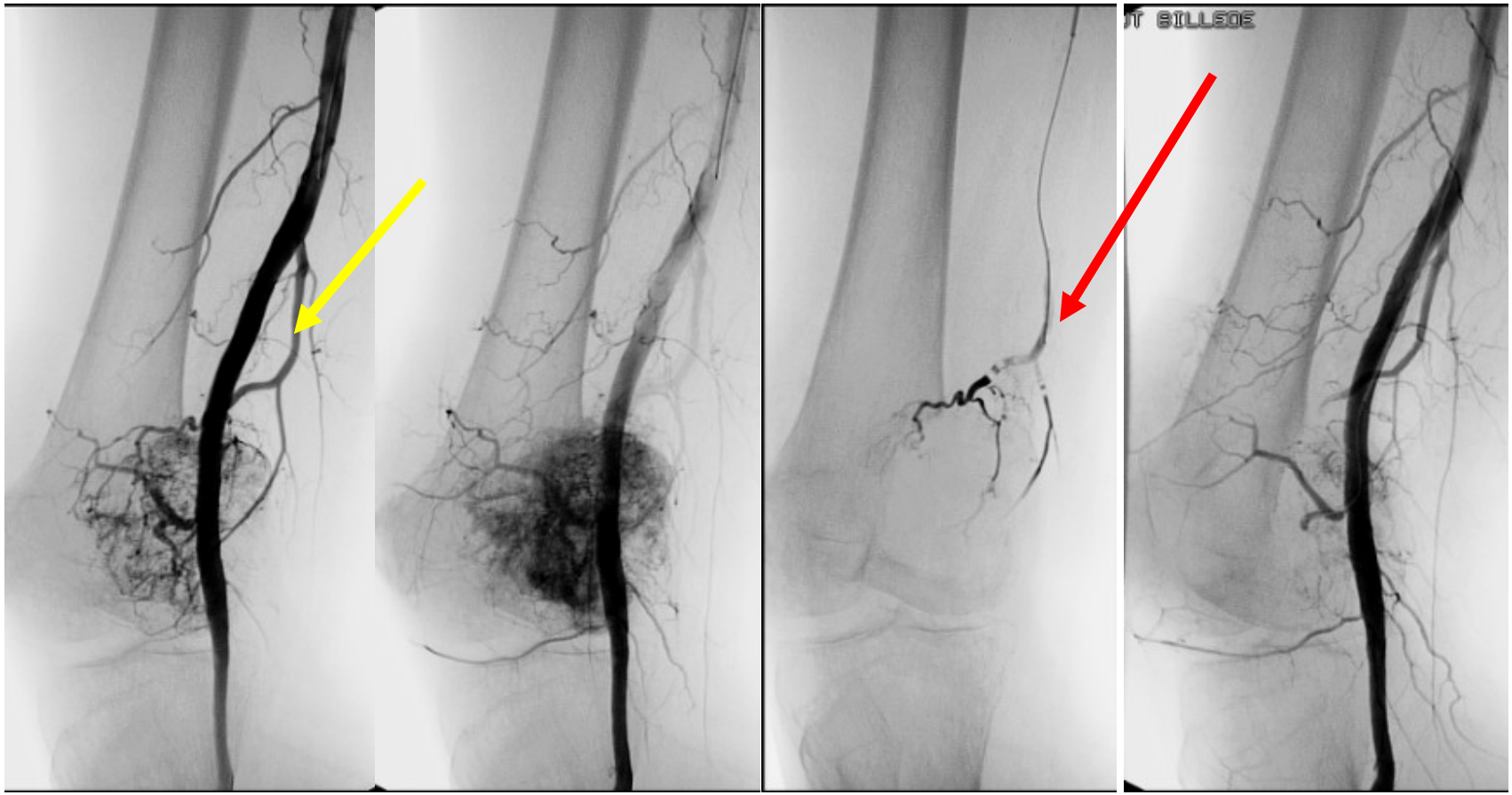


- Preoperativ embolisering før alloplastik
- PVA 300





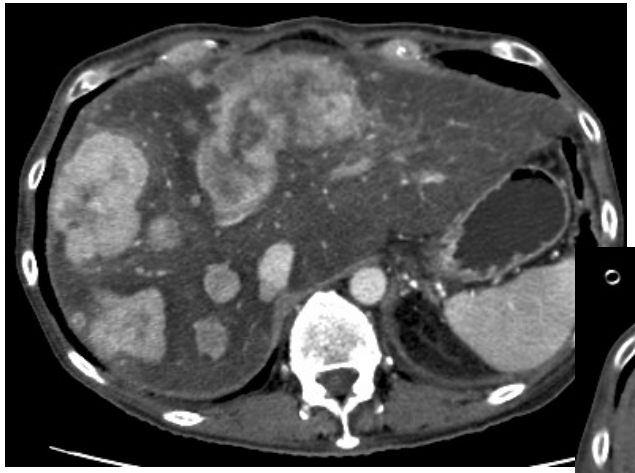
Nyrecancer metastase



Microspheres - Kalibrerede sfæriske partikler

Fidusen er, at partiklerne er tilpasset det kargebet, der skal emboliseres.
Jo mindre partikler, jo længere ud i vævet når de.

Før



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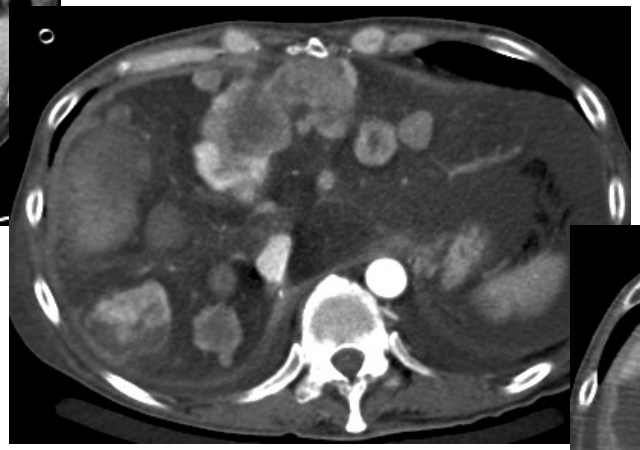

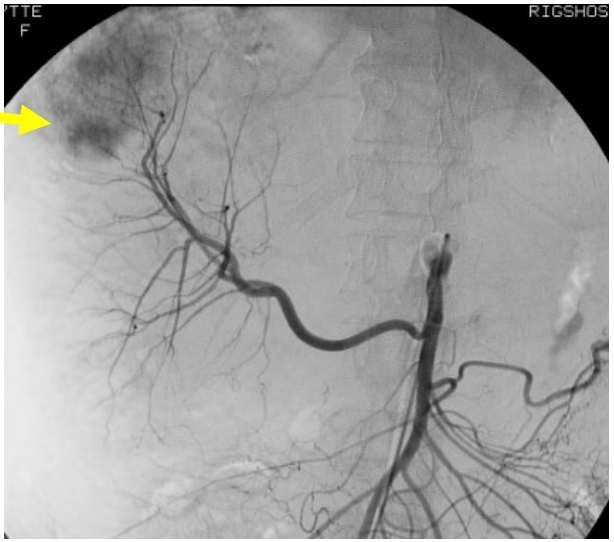

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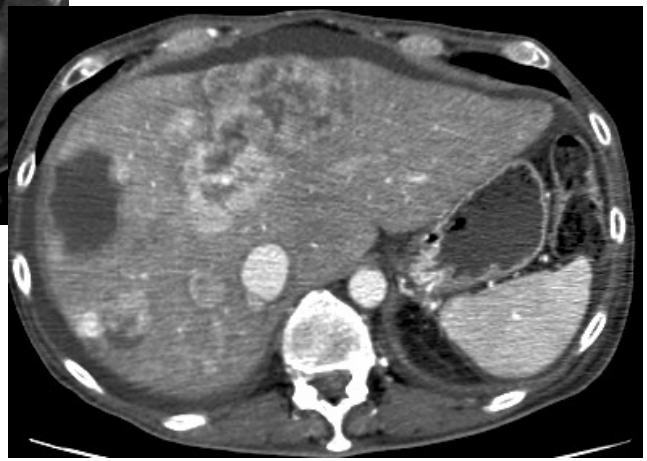


Rigshospitalet
Diagnostisk Center

Prostataarterieembolisering (PAE) –
En ny behandlingsmulighed for symptomgivende forstørret prostata

Mikkel Taudorf, overlæge, klinisk lektor, Rigshospitalet

Rigshospitalet
Diagnostisk Center

LUTS
Vandladningsbesvær

Statusartikel

Ugeskr Læger 2023;185:V10220650

Behandling af benign prostatahyperplasi

Bettina Nørby[1], Andreas Røder[2], Charlotte Graugaard-Jensen[3], Rimas Bliucukis[4] & Niels Toft Mikkelsen[5]

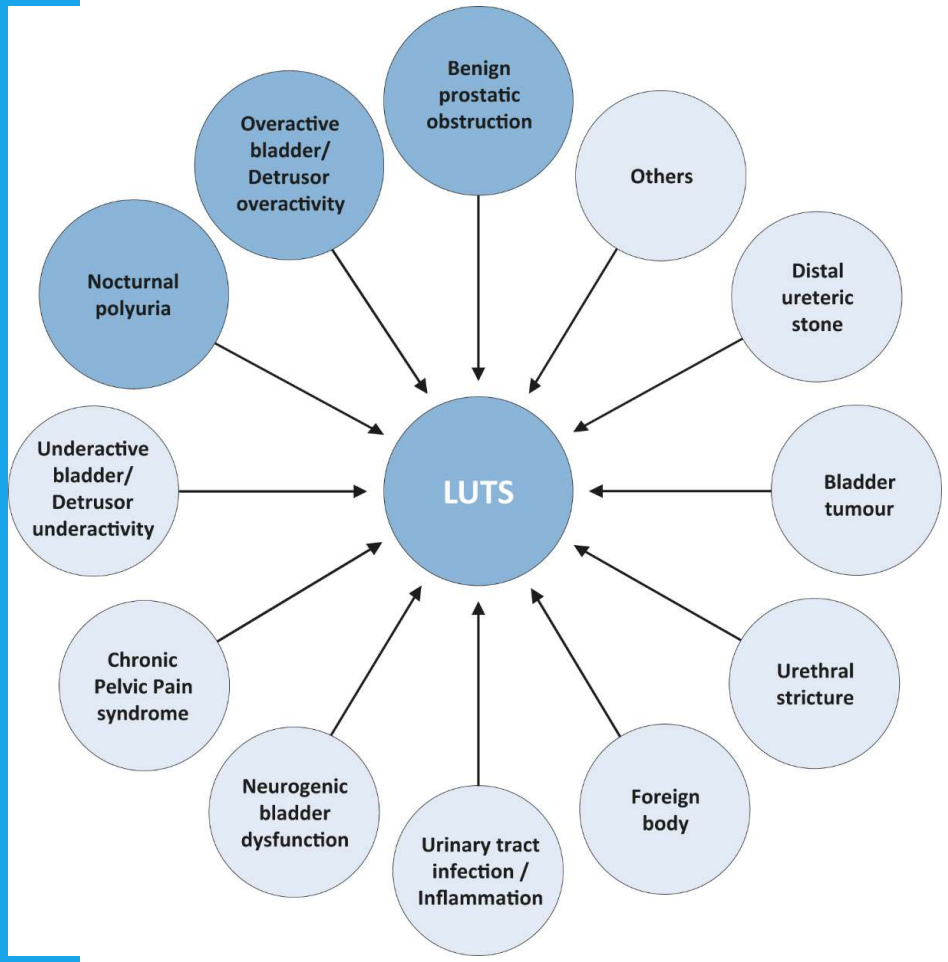
1) Afdeling for Urinvejskirurgi, Sygehus Lillebælt, Vejle Sygehus, 2) Afdeling for Urinvejskirurgi, Københavns Universitetshospital – Rigshospitalet, 3), Urologisk Afdeling, Aarhus Universitetshospital, 4) Urinvejskirurgisk Afdeling, Odense Universitetshospital, Svendborg 5) Afdeling for Urinvejskirurgi, Regionshospitalet Gødstrup

Ugeskr Læger 2023;185:V10220650

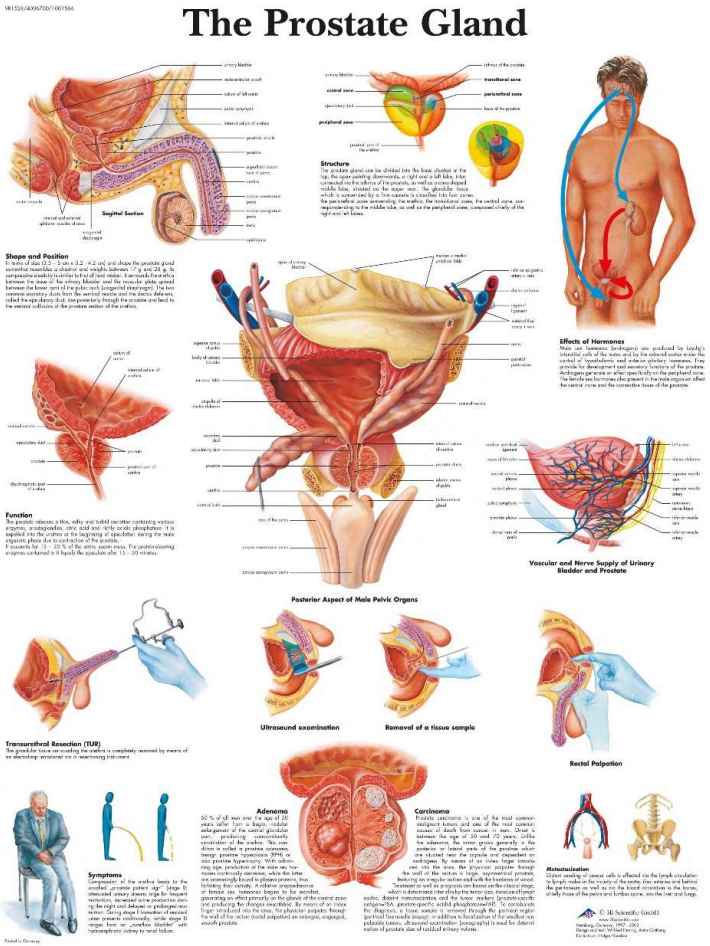
Behandlingsmulighederne for benign prostatahyperplasi (BPH) er øget betydeligt gennem de seneste 30-40 år. Transuretral resektion af prostata (TUR-P) er fortsat den mest veldokumenterede behandling, mens åben kirurgi yderst sjældent anvendes i dag [1]. Et betydeligt antal kirurgisk-teknologiske metoder har været afprøvet gennem årene, hvoraf en del er kommet og gået. Udviklingen af den medicinske BPH-behandling har dog været en stor succes og har medført en reduktion i antallet af kirurgiske BPH-procedurer over tid [2].

HOVEDBUDSKABER

- Grundig udredning af benign prostatahyperplasi (BPH) er essentiel inden beslutning om behandling, da symptomer fra de nedre urinveje er uspecifikke.
- Blandt kirurgiske teknikker til behandling af BPH er transuretral resektion af prostata fortsat guldstandard ved prostatavolumen ≤ 80 cm^3.
- Valg af behandling af BPH afhænger af faktorer hos patienten og af patientpræference.



EAU Guidelines.
Edn. presented at the EAU Annual Congress Milan March 2023.
ISBN 978-94-92671-19-6.



Case Report

Relief of Benign Prostatic Hyperplasia-related Bladder Outlet Obstruction after Transarterial Polyvinyl Alcohol Prostate Embolization[1]

John S. DeMeritt, MD
Fakhir F. Elmasri, MD
Michael P. Esposito, MD
Gene S. Rosenberg, MD

Index terms: Prostate, hypertrophy • Prostate, therapeutic radiology

JVIR 2000; 11:767–770

THE standard management of benign prostatic hyperplasia (BPH) is based on overall patient health and the severity of symptoms. Voiding difficulties attributable to BPH can be quantified with the International Prostatic Symptom Score, a questionnaire consisting of seven symptom categories, with a range of increasingly severe symptom scores from 0 through 35. The score is based on the severity of each of the

CASE HISTORY

A 76-year-old man with a history of moderately symptomatic BPH, treated with oral α-adrenergic blocker therapy, developed acute urinary retention. He was then admitted to the urology service and treated with transurethral catheter drainage for 2 weeks, and finasteride (5-alpha reductase inhibitor) was added to his medical regimen.

Randomized Controlled Trial > Radiology. 2014 Mar;270(3):920-8. doi: 10.1148/radiol.13122803.
Epub 2013 Nov 13.

Benign prostatic hyperplasia: prostatic arterial embolization versus transurethral resection of the prostate--a prospective, randomized, and controlled clinical trial

Yuan-an Gao [1], Yan Huang, Rui Zhang, Yu-dong Yang, Qing

Affiliations + expand

PMID: 24475799 DOI: 10.1148/radiol.13122803

PAE på Rigshospitalet

- 2017 - nyt samarbejde mellem Urologisk og Radiologisk klinikker
- Feasibillity study

› Diagnostics (Basel). 2019 Apr 25;9(2):46. doi: 10.3390/diagnostics9020046.

Prostate Artery Embolization for Lower Urinary Tract Symptoms in Men Unfit for Surgery

Brian Malling [1], Lars Lönn [2], Ruben Juhl Jensen [3], Mats Lindh [4], Susanne Frevert [5], Klaus Brasso [6], Martin Andreas Røder [7]

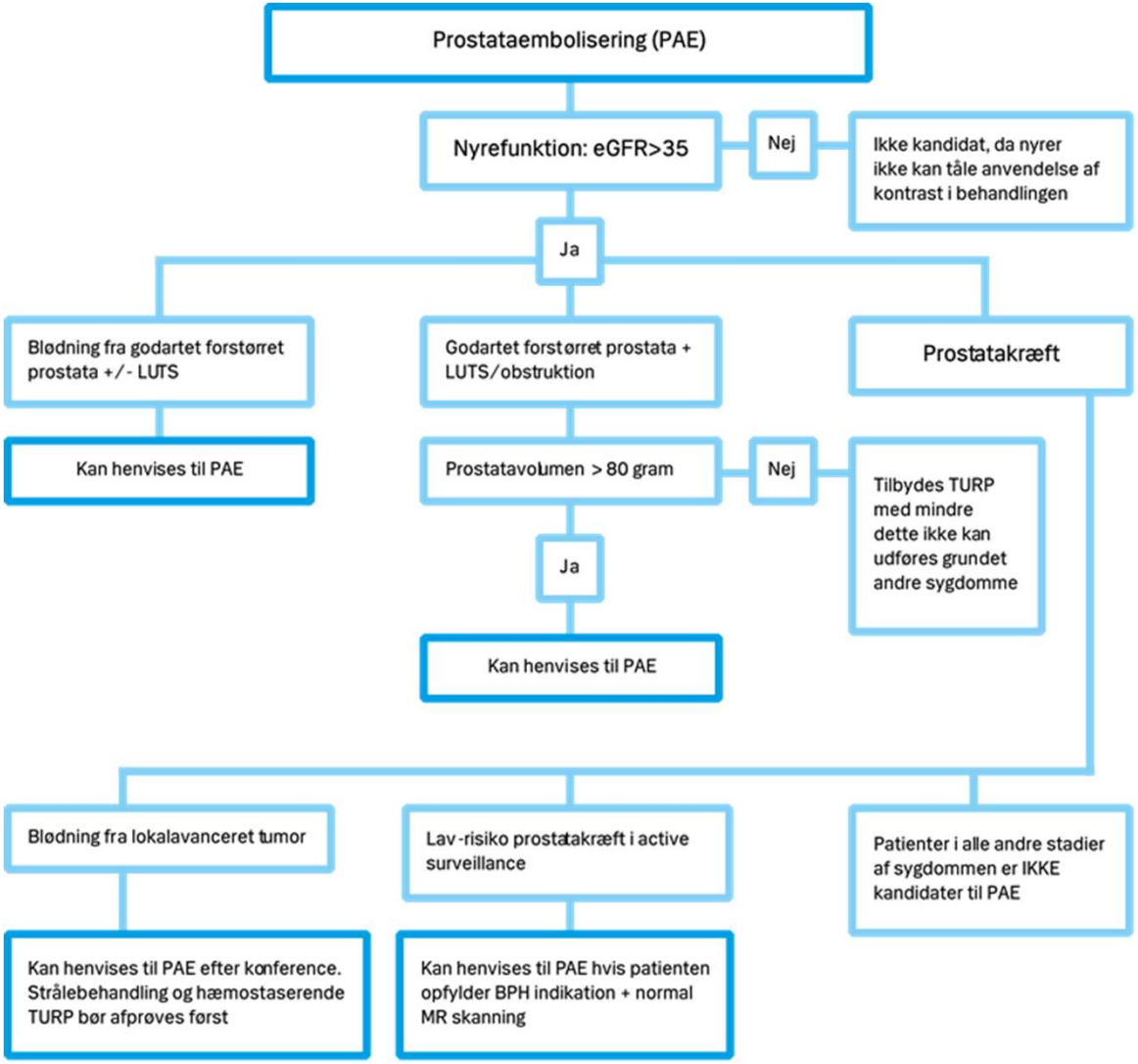
Affiliations + expand

PMID: 31027211 PMCID: PMC6628284 DOI: 10.3390/diagnostics9020046

Free PMC article

Nuværende indikation

- Behandlingsalternativ til kirurgisk intervention
- PV >80mL
- Tilladelig anatomi



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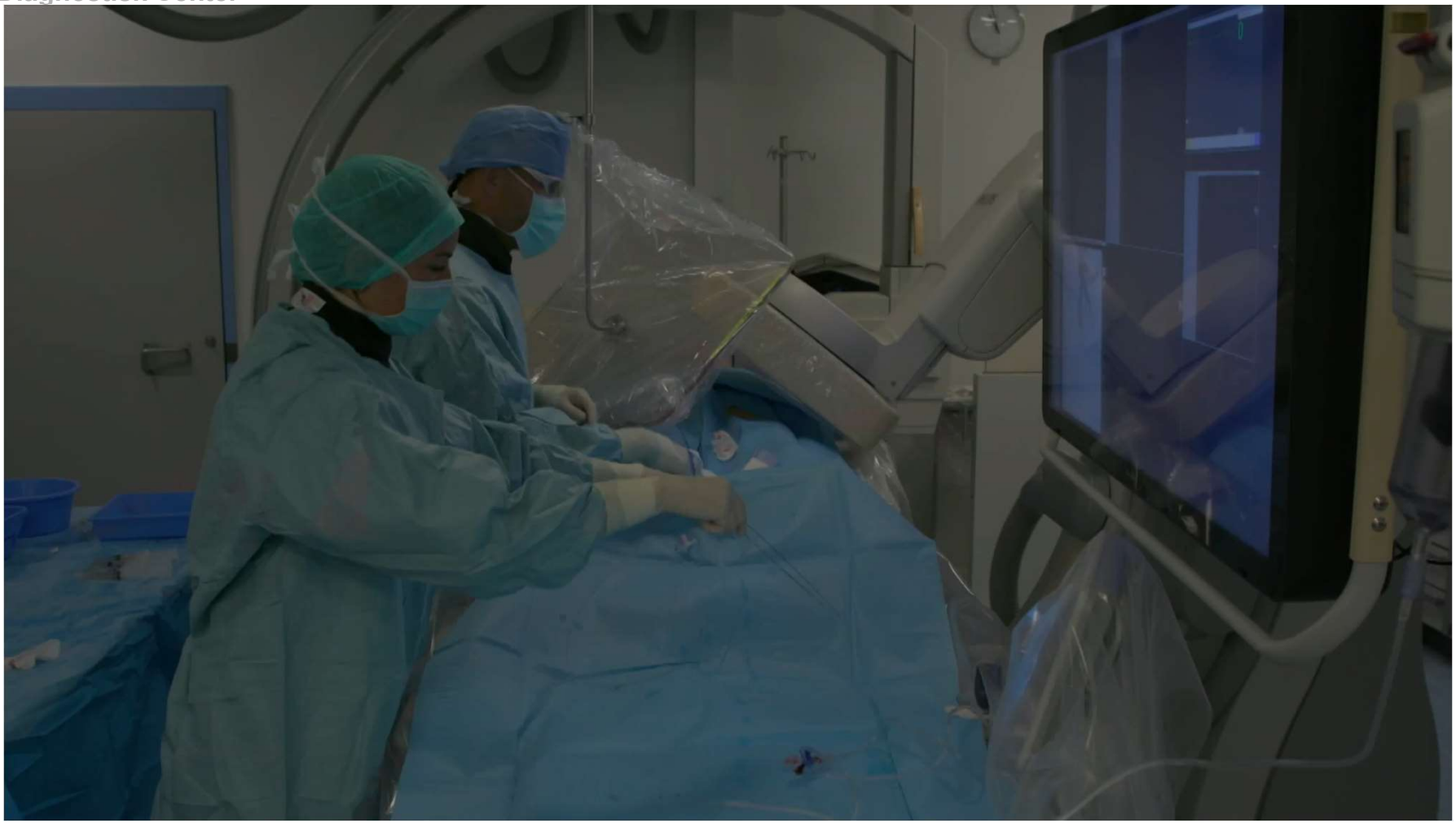

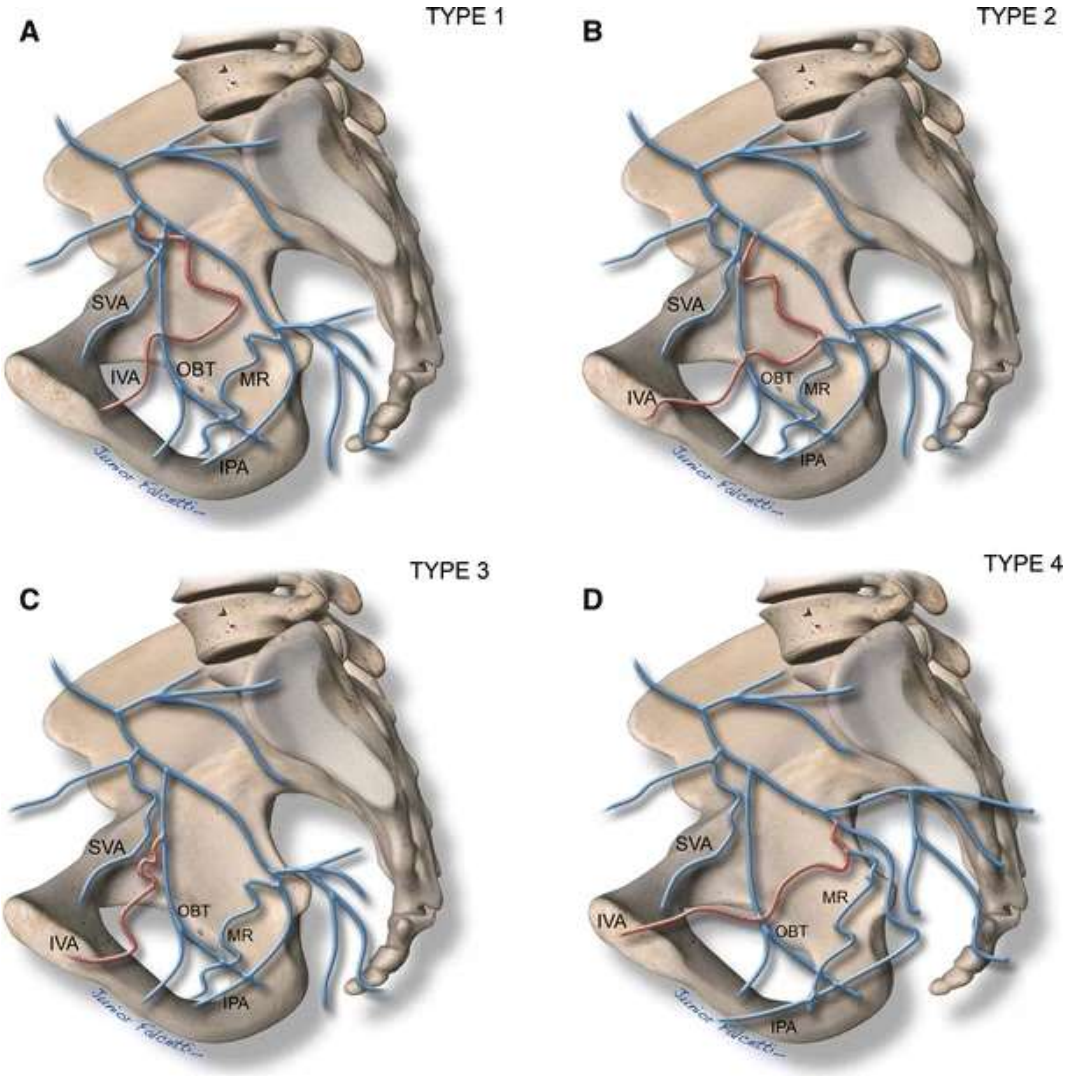

Carnevale et al, CVIR 2017

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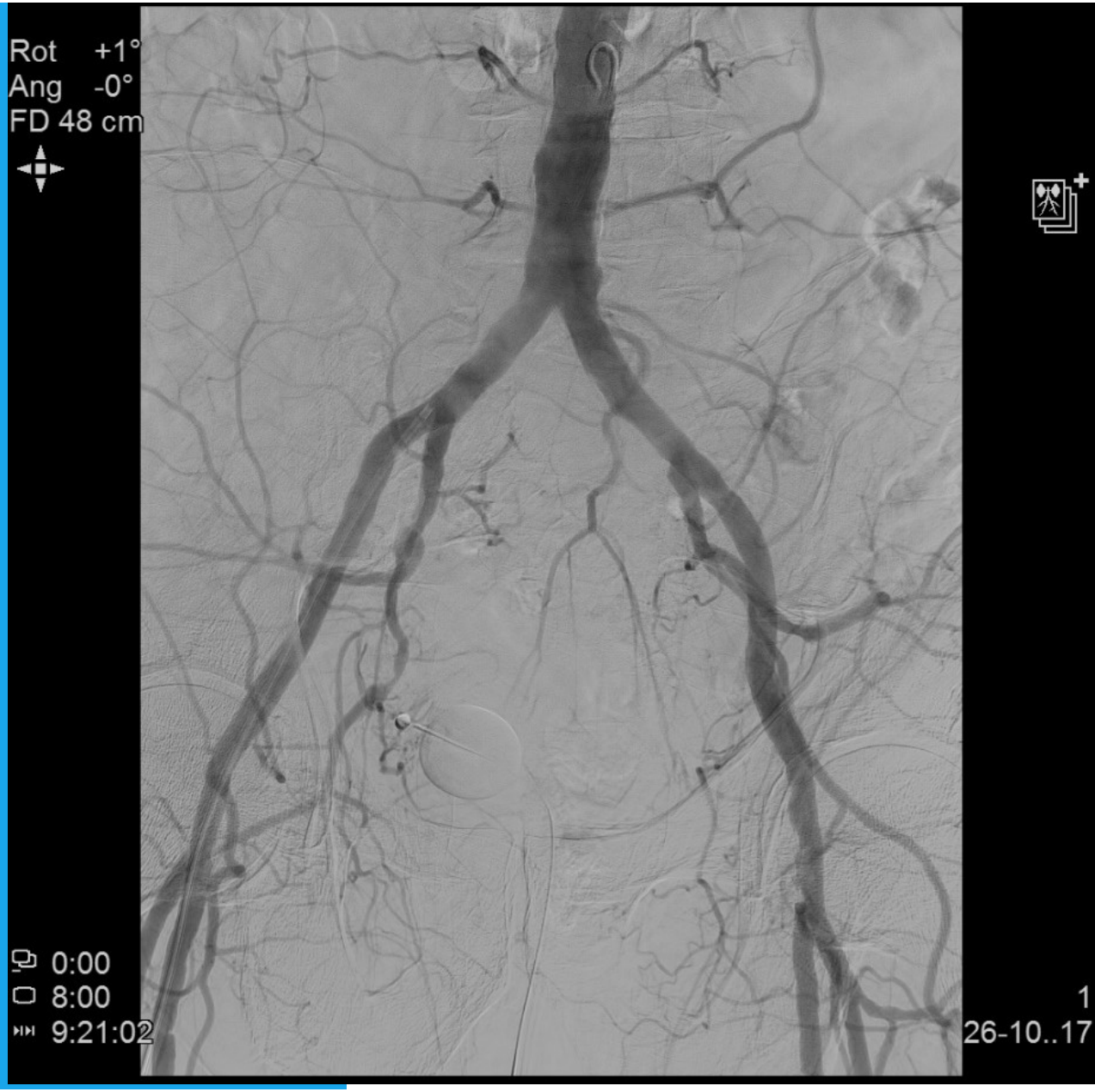
Udfordringer



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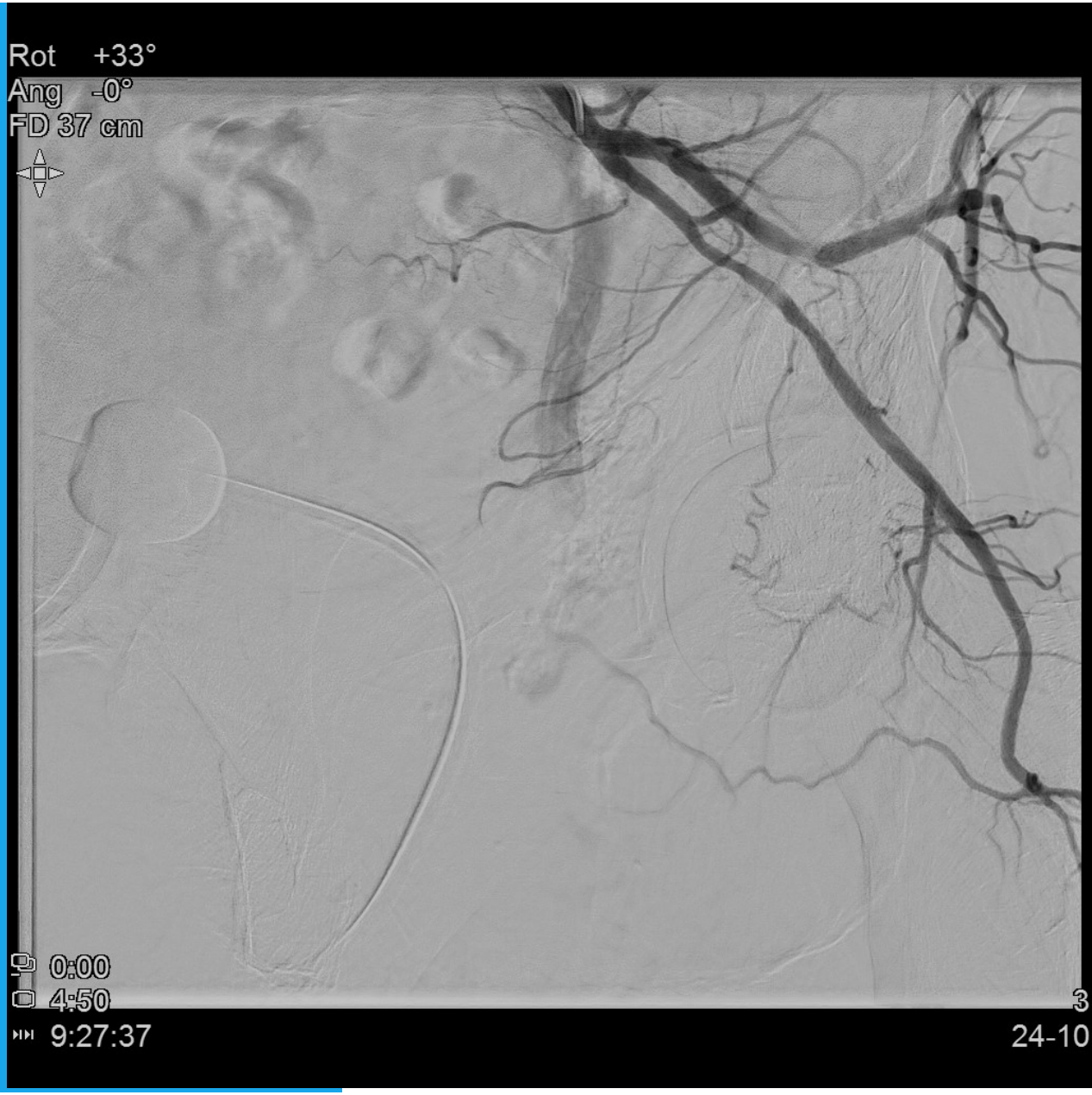
Udfordringer

- Vekslende karanatomi



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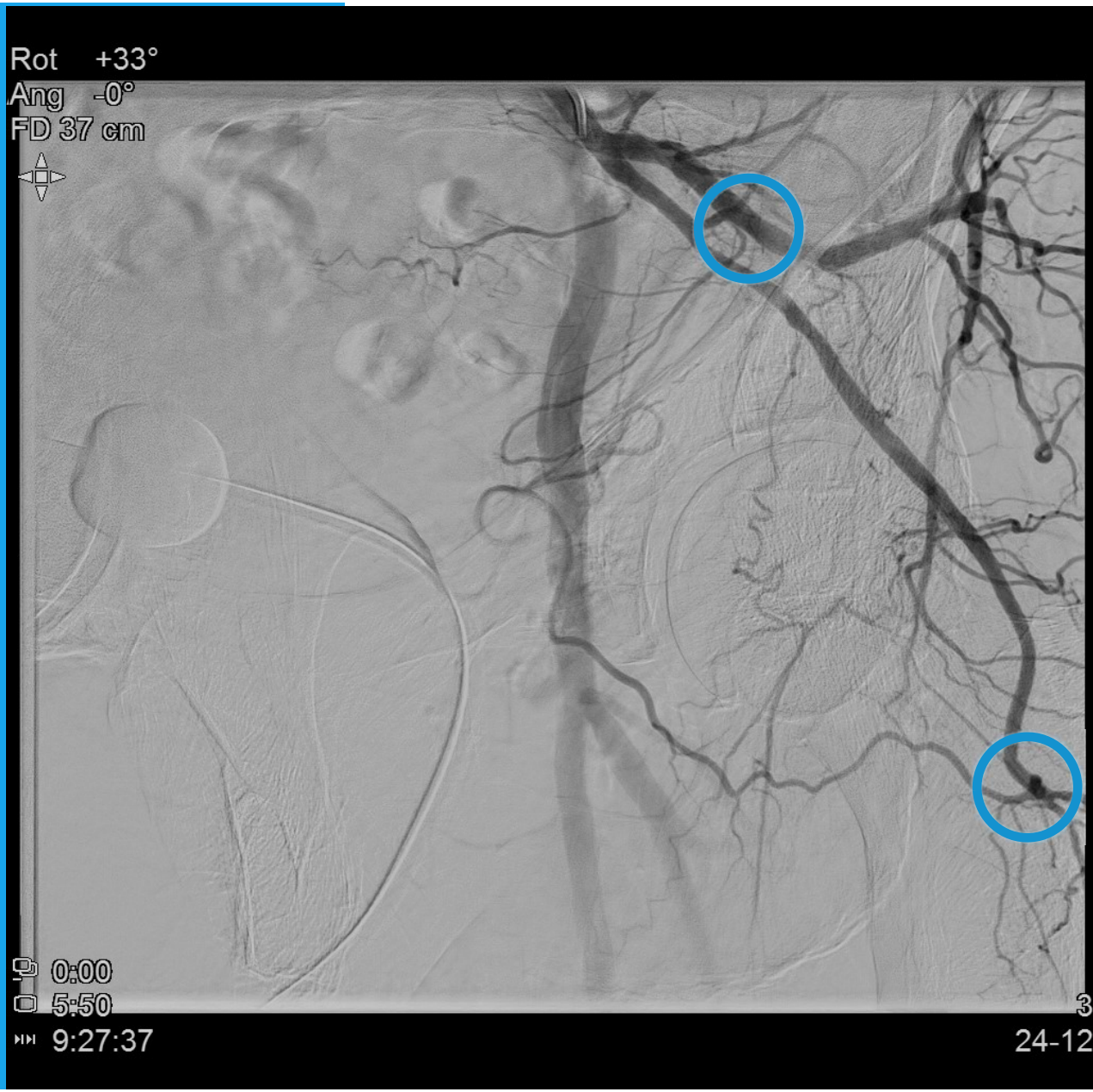
Udfordringer

- Aflukning af ”hovedvej”



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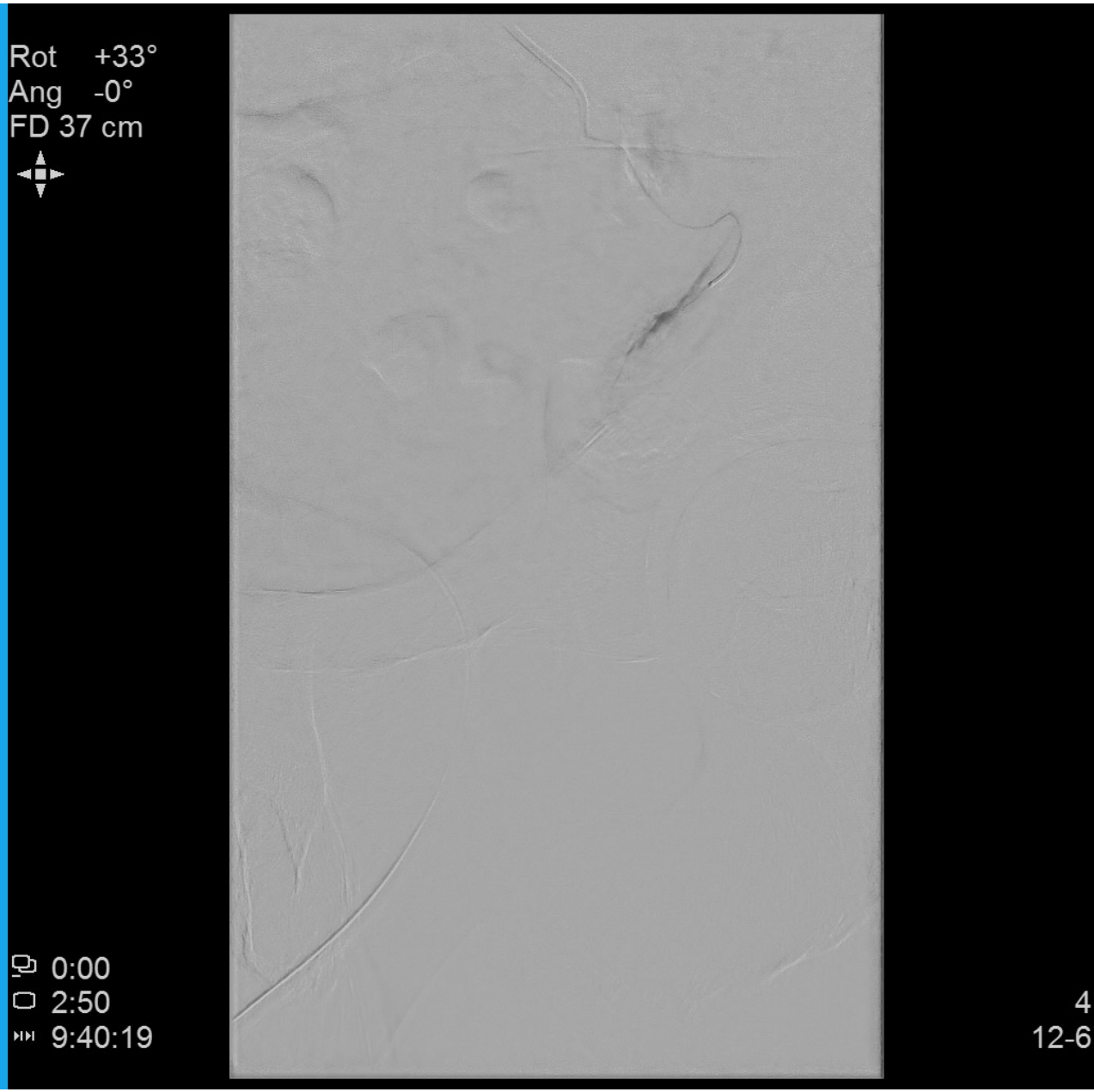
Udfordringer

- Aflukning af ”hovedvej”



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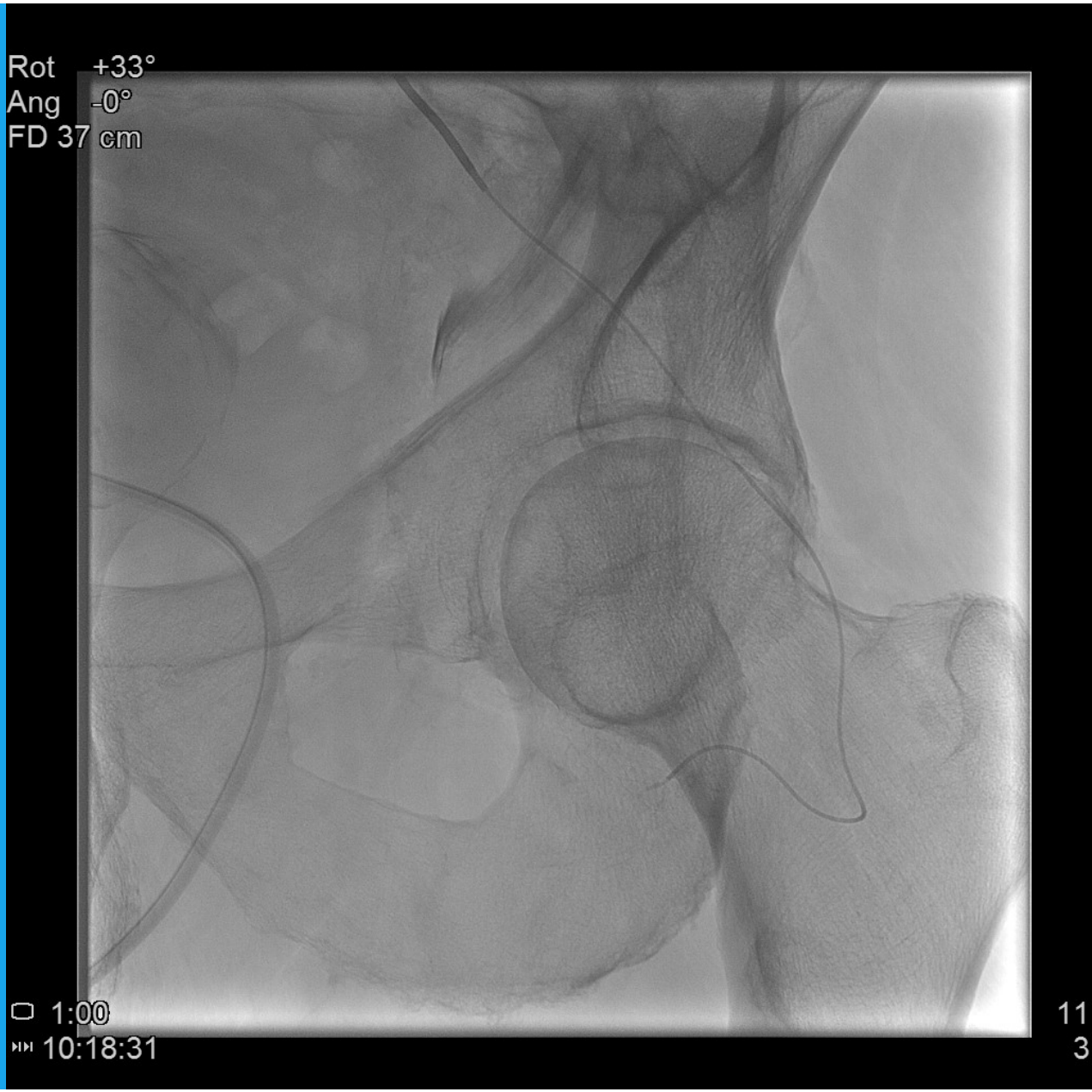
Udfordringer

- Aflukning af ”hovedvej”



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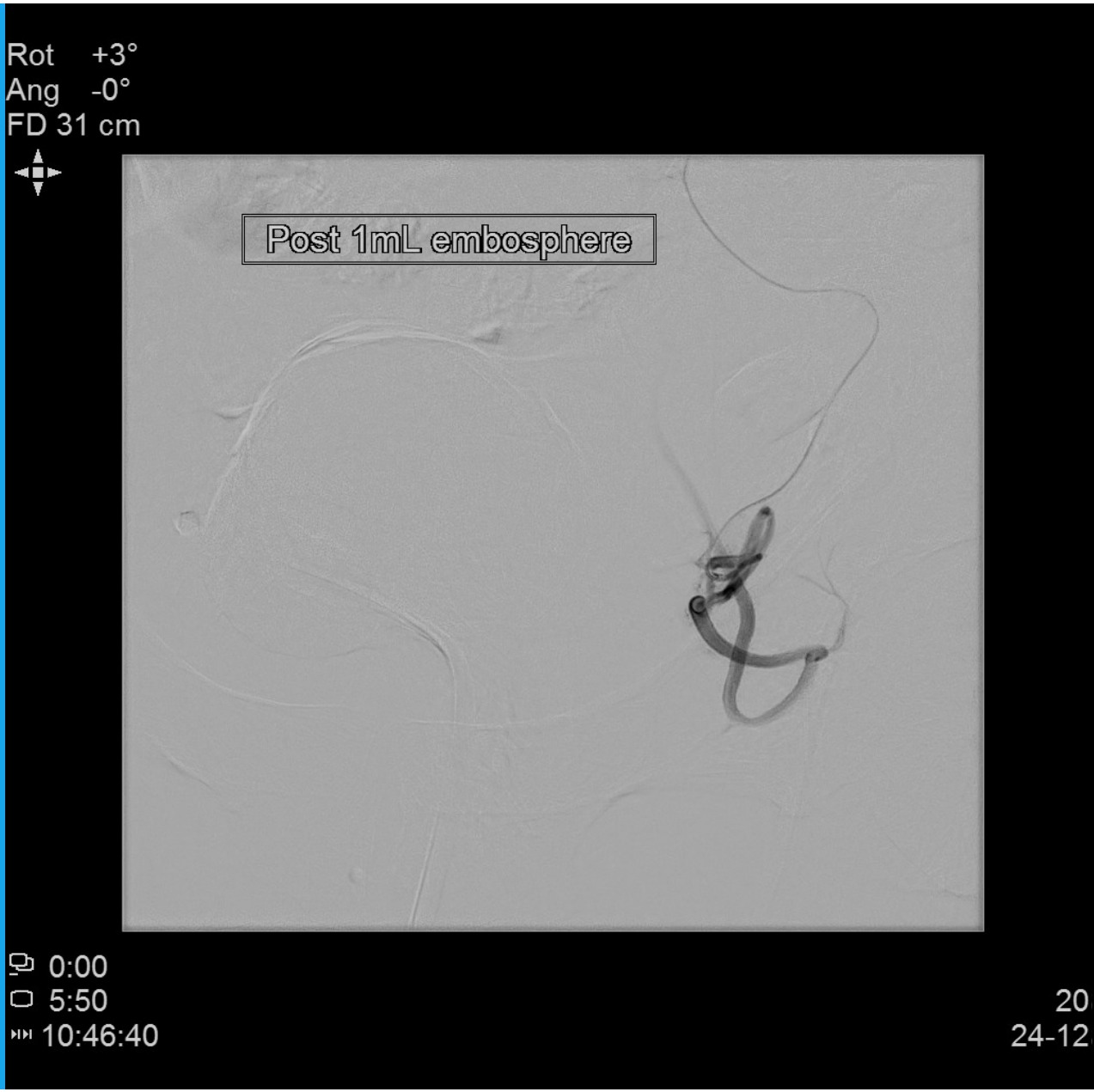
Udfordringer



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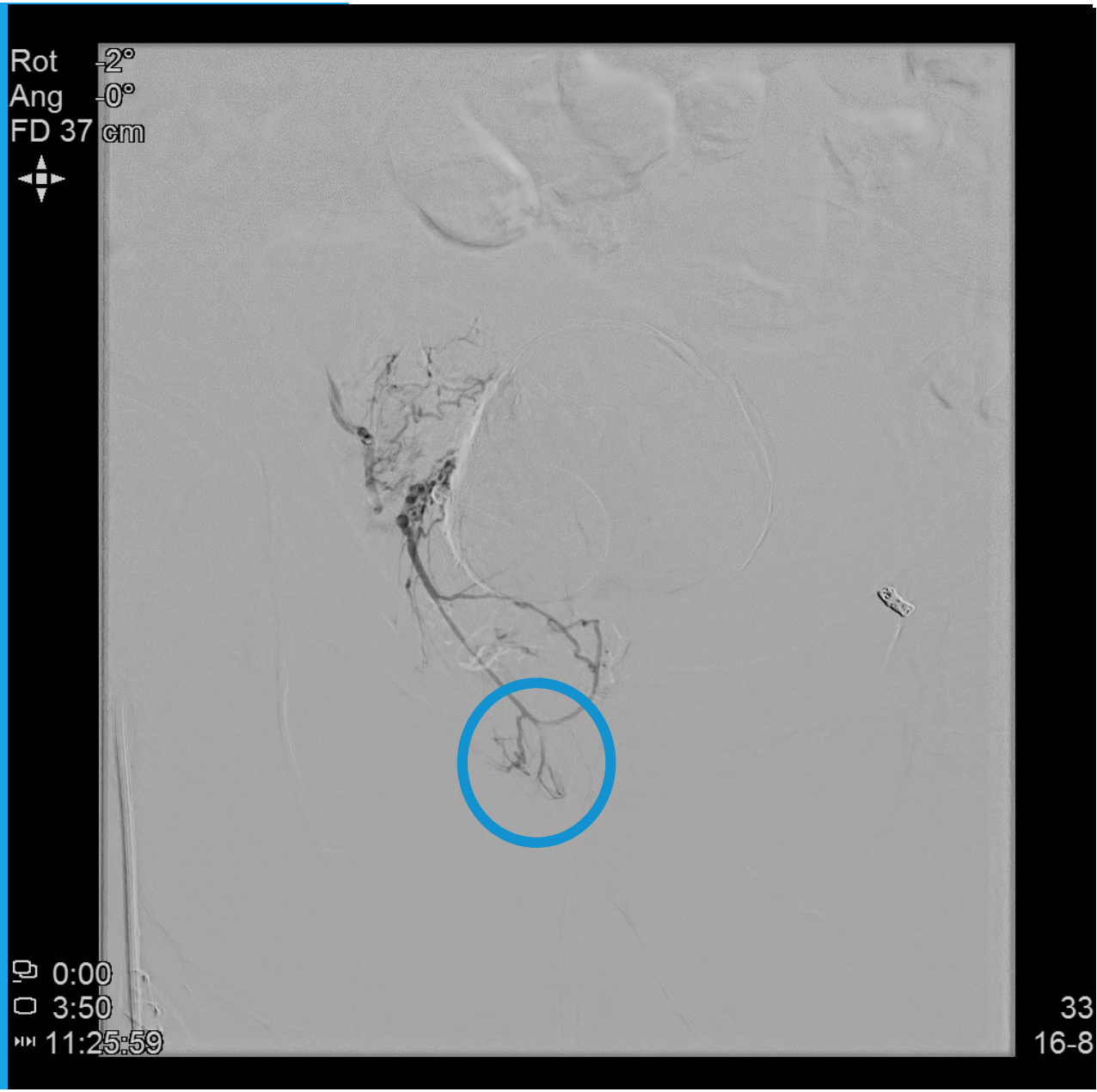
Udfordringer

- Forbindelse til afveje



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PAE-studier på Rigshospitalet

- Systematisk Review
- Palliativ PAE ved c.prostata
- Case-report med hæmofili-patienter
- Strålingsstudier
- PerfusionsCT som prædiktor for succes
- RCT om at nedsætte bivirkningsprofil
- RCT PAE vs TUMT (multicenter-studie)

PRESSE OG NYT

Bittesmå kugler tager pulsen på prostata

Tusinder af danske mænd får hvert år problemer med at tisse på grund af forstørret prostata. Ny behandling med mikropartikler kapper blodforsyningen og får den forvoksede kirtel til at skrumpe.

Diagnostics (Basel). 2020 Sep; 10(9): 659. PMCID: PMC7555179
Published online 2020 Aug 31. doi: 10.3390/diagnostics10090659 PMID: 32878325

Postembolization Syndrome after Prostatic Artery Embolization: A Systematic Review

Petra Svarc,[1,*] Mikkel Taudorf,[1] Michael Bachmann Nielsen,[1] Hein Vincent Stroomberg,[2] Martin Andreas Røder,[2] and Lars Lönn[1]

CVIR Endovasc. 2022 Dec; 5: 21. PMCID: PMC9023631
Published online 2022 Apr 21. doi: 10.1186/s42155-022-00299-x PMID: 35449378

Prostatic artery embolization in men with severe hemophilia a: a case report of two patients

Petra Svarc,[✉1,2] Peter Kampmann,[3] Lars Lönn,[1,2] and Martin Andreas Røder[2,4]

Palliative Prostate Artery Embolization for Prostate Cancer: A Case Series

B. Malling ✉, M. A. Røder, M. Lindh, S. Frevert, K. Brasso & L. Lönn

CardioVascular and Interventional Radiology **42**, 1405–1412 (2019) | Cite this article

BMJ Open. 2021; 11(11): e047878. PMCID: PMC8562514
Published online 2021 Nov 1. doi: 10.1136/bmjopen-2020-047878 PMID: 34725072

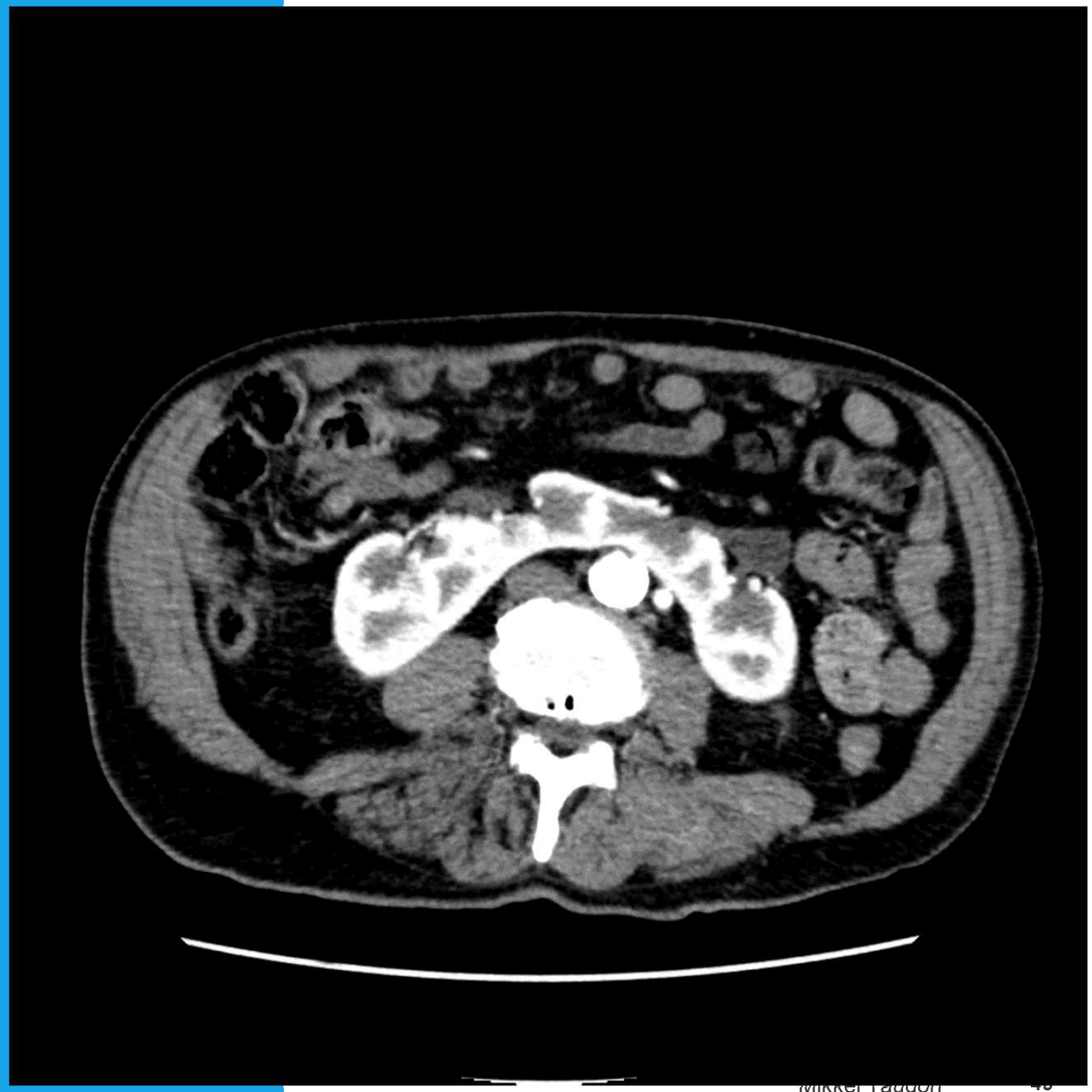
Protocol

Efficacy of dexamethasone in reducing the postembolisation syndrome in men undergoing prostatic artery embolisation for benign prostatic hyperplasia: protocol for a single-centre, randomised, double-blind, placebo-controlled trial—the 'DEXAPAE' study

Petra Svarc,[✉1,2] Hein Vincent Stroomberg,[2,3] Ruben Juhl Jensen,[1] Susanne Frevert,[1] Mats Håkan Lindh,[1] Mikkel Taudorf,[1,2] Klaus Brasso,[2,3] Lars Lönn,[1,2] and Martin Andreas Røder[2,3]

Unfit for surgery (case)

- Stor prostata >400mL
- Urinretention efter anden kirurgi
- Alm. uretralkateter ikke muligt
- Topkateter



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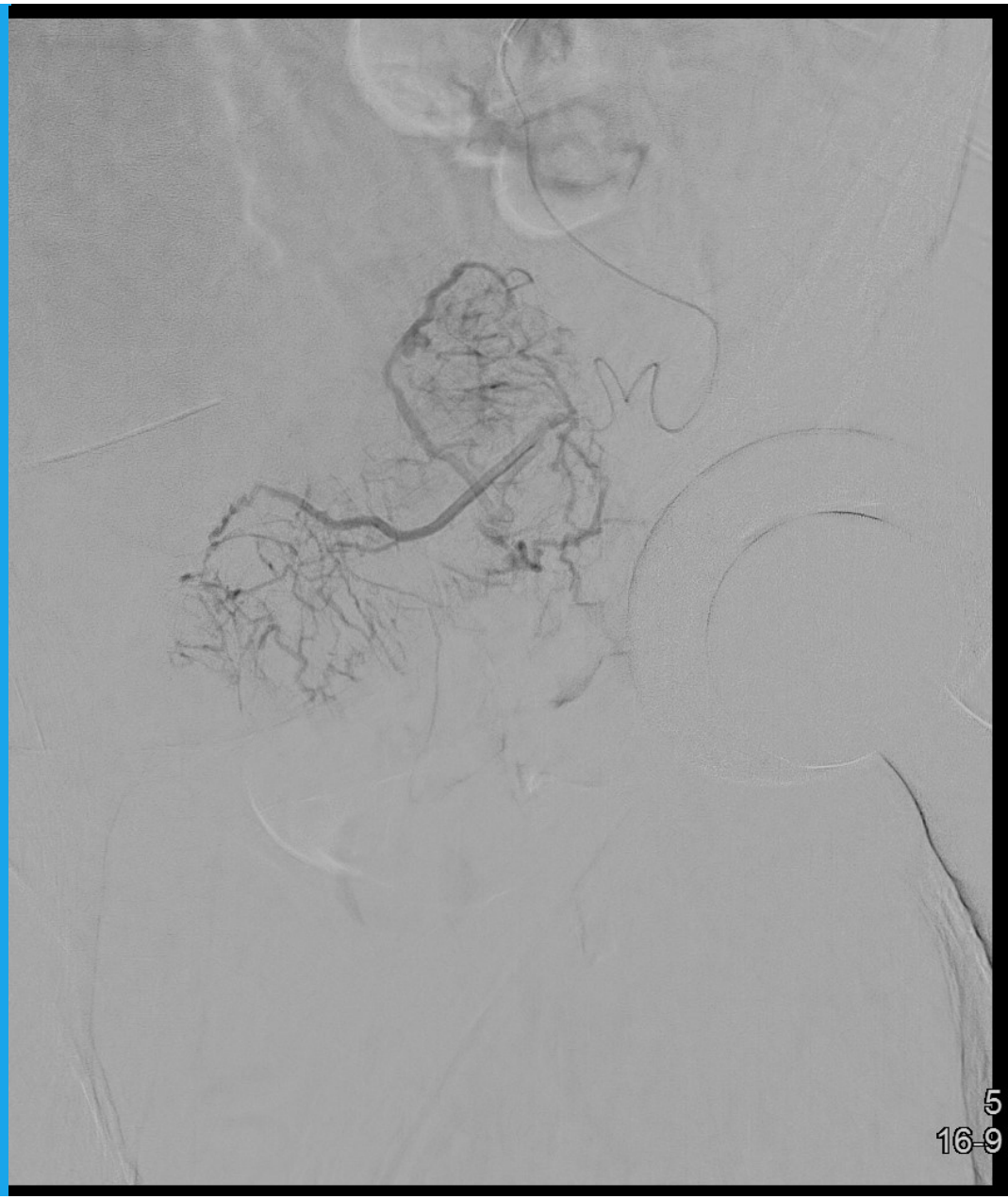
Unfit for surgery (case)

- Stor prostata >400mL
- Urinretention efter anden kirurgi
- Alm uretralkateter ikke muligt
- Topkateter
- CT viser mulighed for PAE
- Først venstre side



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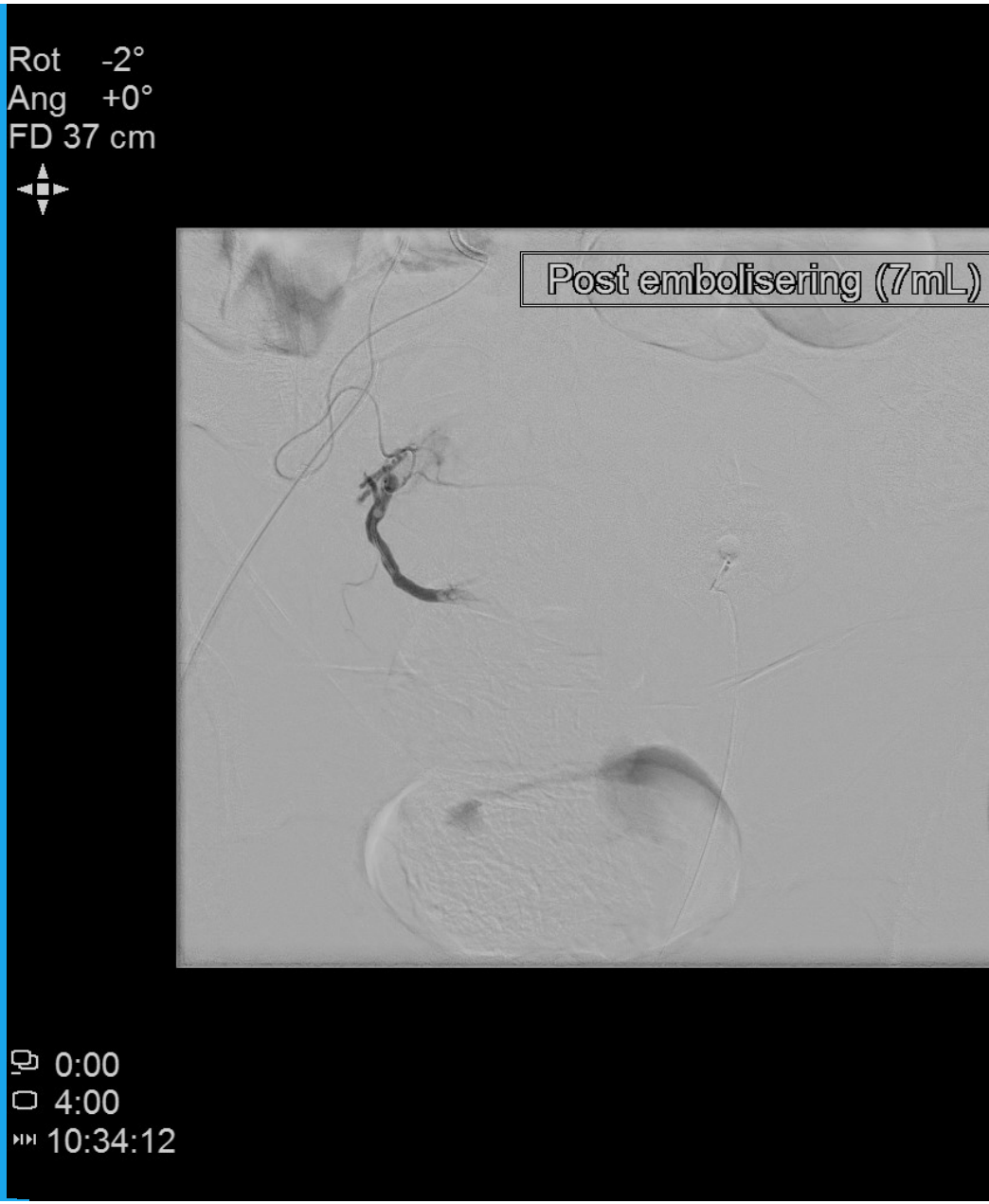
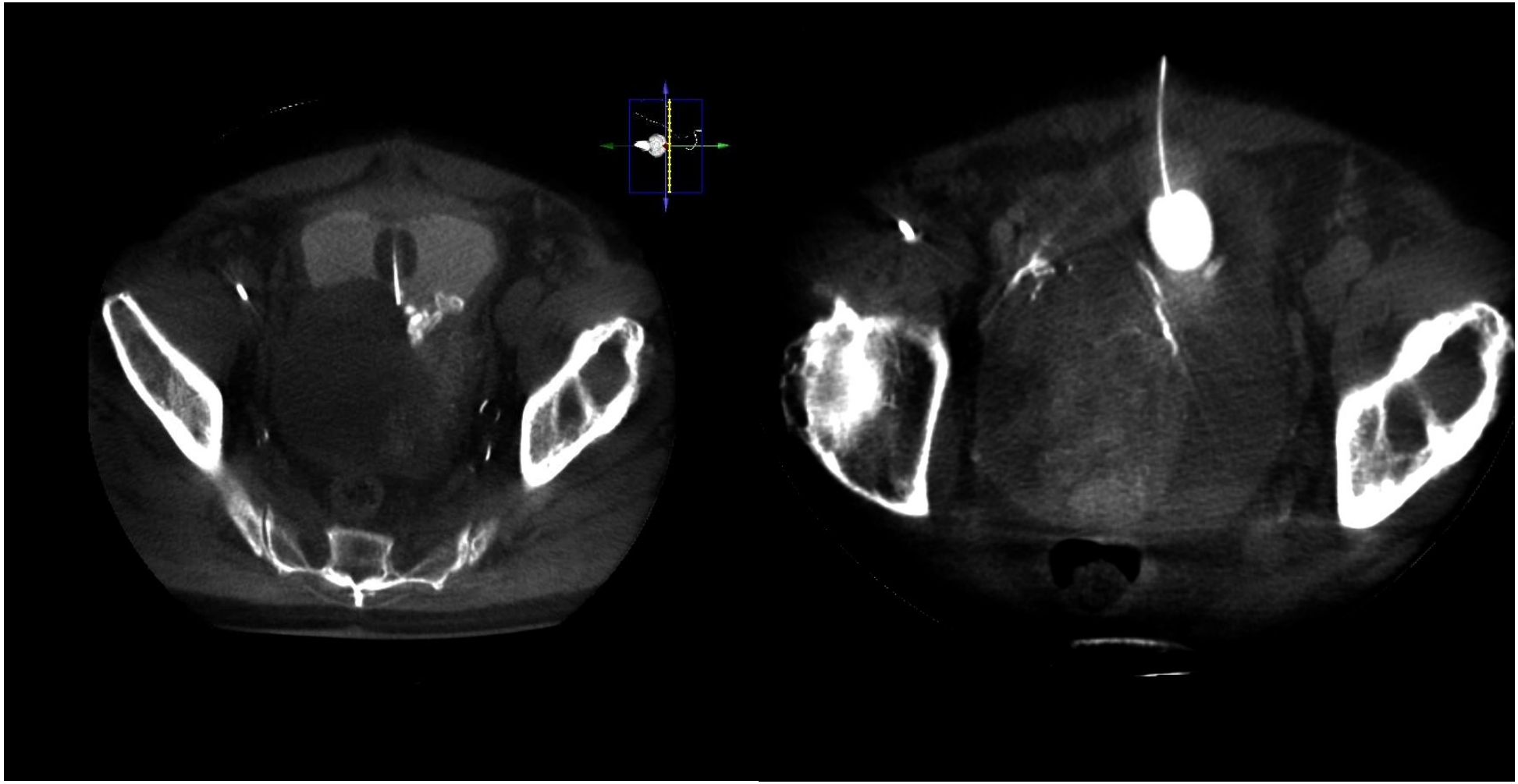
Unfit for surgery (case)

- Stor prostata >400mL
- Urinretention efter anden kirurgi
- Alm uretralkateter ikke muligt
- Topkateter
- CT viser mulighed for PAE
- 3 mdr. senere højre side





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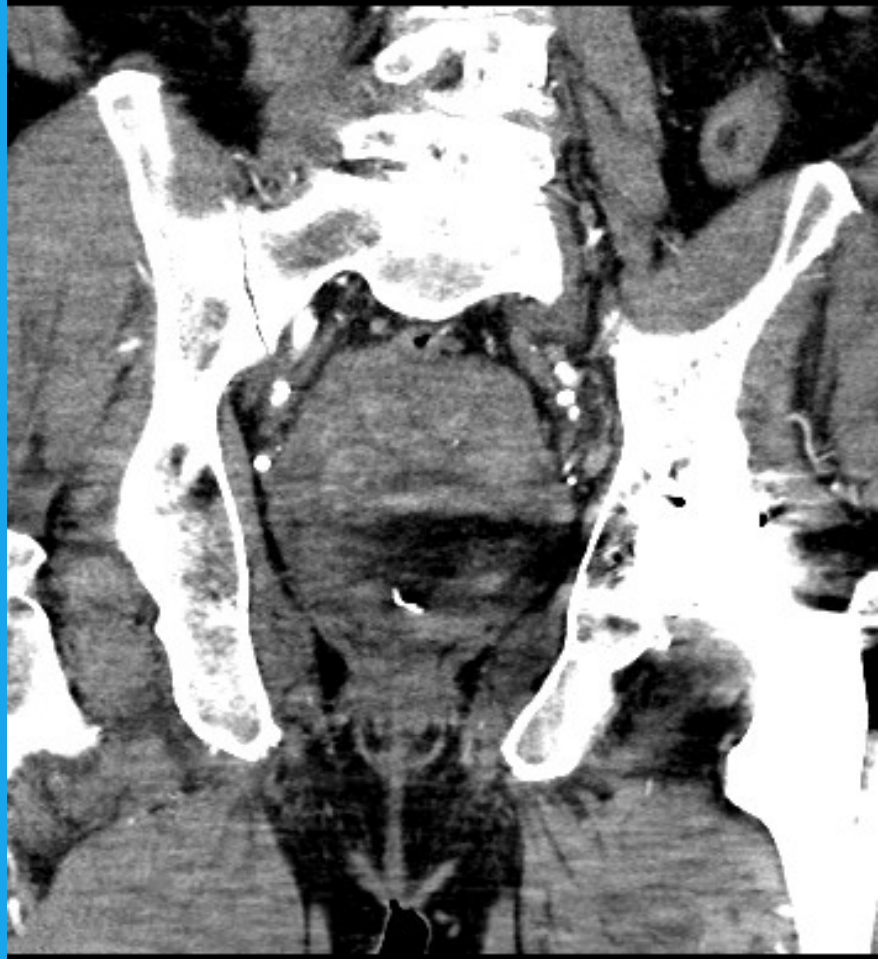
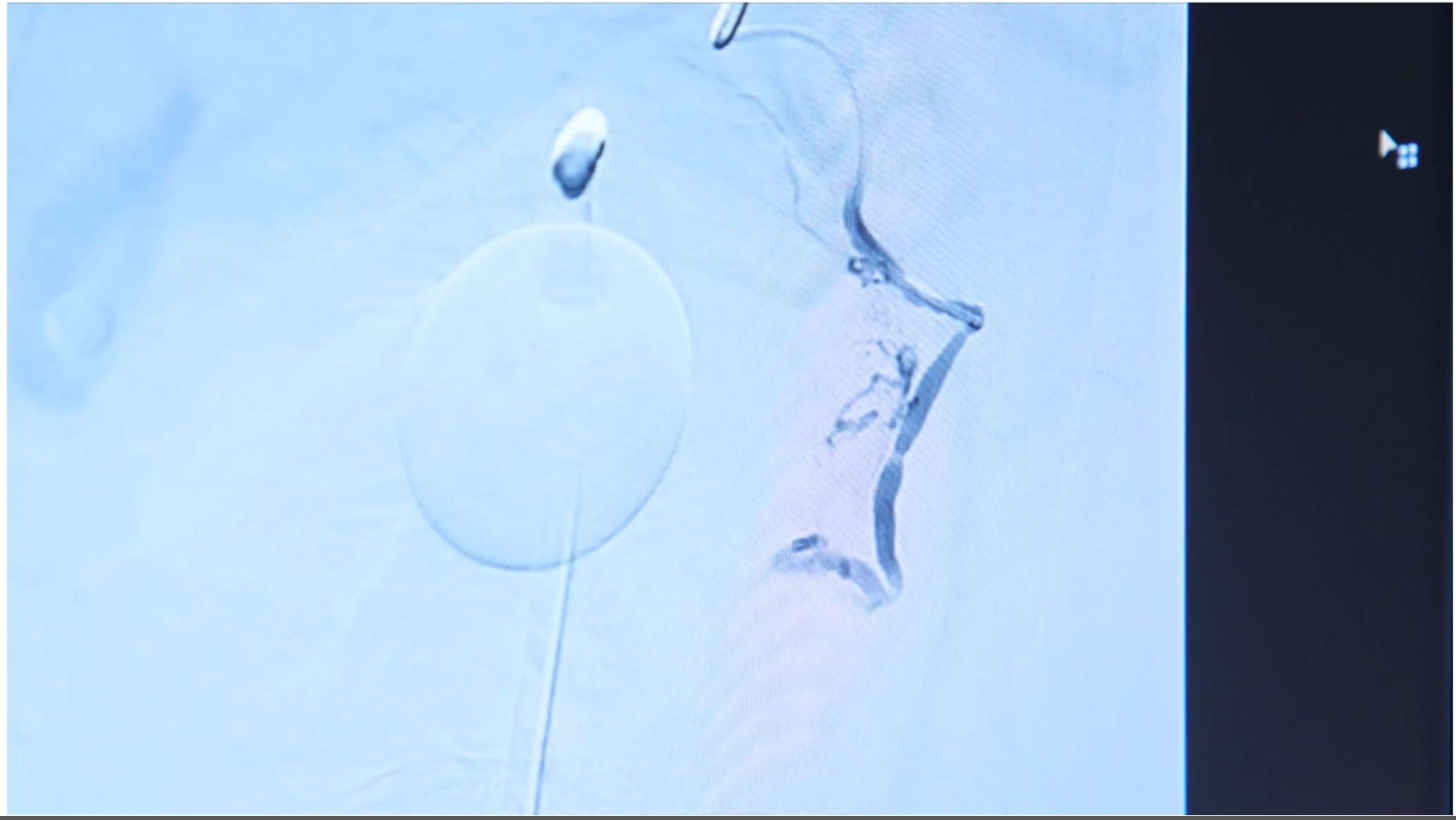
Unfit for surgery (case)

- Follow-up
- 3 mdr. efter 1. PAE
  - Begyndende vandladning
  - Aftagende størrelse ca. 320mL
- 3 mdr. efter 2. PAE
  - fin vandladning, lille residual volumen, sep. top-kateter
  - Yderligere aftagende størrelse ca. 280mL
- 6 mdr. efter 2. PAE
  - Lader vandet frit



REGION



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Paneldiskussion

- Prof. Andreas Røder
- Prof. Lars Lönn
- Cheflæge Martin Lundsgaard Hansen


Grand Rounds
Rigshospitalet
Paneldebat


Grand Rounds
Rigshospitalet
Tak for i dag