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Complication During Mitral Valve Intervention

Horst Sievert,

Ilona Hofmann, Laura Vaskelyte, Sameer Gafoor, Stefan Bertog, Predrag Matić, Markus Reinartz, Bojan Jovanovic, Kolja Sievert, Iris Grunwald, Nalan Schnelle

CardioVascular Center Frankfurt - CVC,

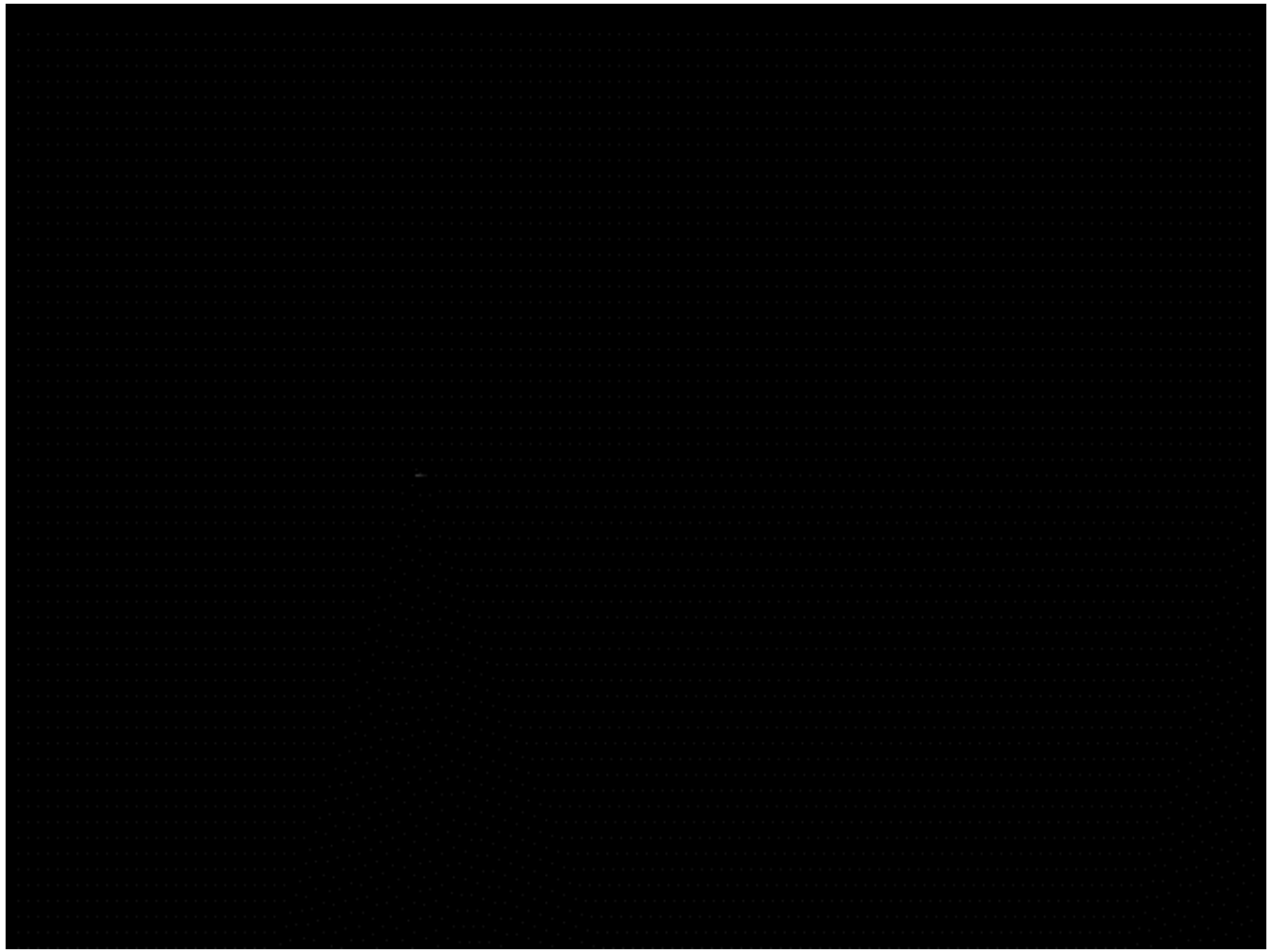
Frankfurt, Germany

Interdisciplinary Heart Team Complication

Disclosures

Physician name	Company	Relationship
Horst Sievert	Abbott, Ablative Solutions, Ancona Heart, Bioventrix, Boston Scientific, Carag, Cardiac Dimensions, Celonova, Cibiem, CGuard, Comed B.V., Contego, CVRx, Edwards, Gardia, Hemoteq, InspireMD, Kona Medical, Lifetech, Maquet Getinge Group, Medtronic, Occlutech, pfm Medical, Recor, St. Jude Medical, Terumo, Trivascular, Vascular Dynamics, Venus, Veryan	Consulting fees, Travel expenses, Study honoraria

Neochord - Mitral valve repair



- Transapical access
- Insertion of the delivery instrument
- Leaflet capture
- White lights confirm leaflet capture
- Goretex suture is grabbed by a needle
- Needle pulled out together with suture
- Delivery instrument removed
- Tension is applied to eliminate leaflet prolapse

Neochord - Mitral valve repair

- Completely echo guided
- Does leave all other options open
- Posterior as well as anterior leaflet prolapses can be treated
- Allows very precise adjustment of the chordae on beating heart
  - "much better than we can do during open heart surgery"
- Has become our treatment of choice not only in high surgical risk patients

Neochord - Mitral valve repair

- It does require general anesthesia
  - in contrast to MitraClip
- We have learned the hard way that the transapical access seems to be more traumatic than the transapical access for TAVR
  - bleeding and risk of rupture
  - You always need a cell saver

Heart Team Discussion: "We have to reduce the risk of bleeding complications"

- Stop anticoagulation and aspirin/plavix several days before the procedure
- Give heparin only after access to the LV has been obtained (= insertion of the delivery instrument)
- Don't do this in elderly frail patients
  - especially not in woman > 80 yrs

Setting

- Tertiary referral hospital, 3 times larger than ours
  - All sorts of departments and specialists
- On site cardiac surgery
  - Surgeon very experienced in transapical TAVR
- Experienced cardiac anesthetist
  - "best in institution"
- Experienced proctors for NeoChord
  - TEE and surgery

Patient history

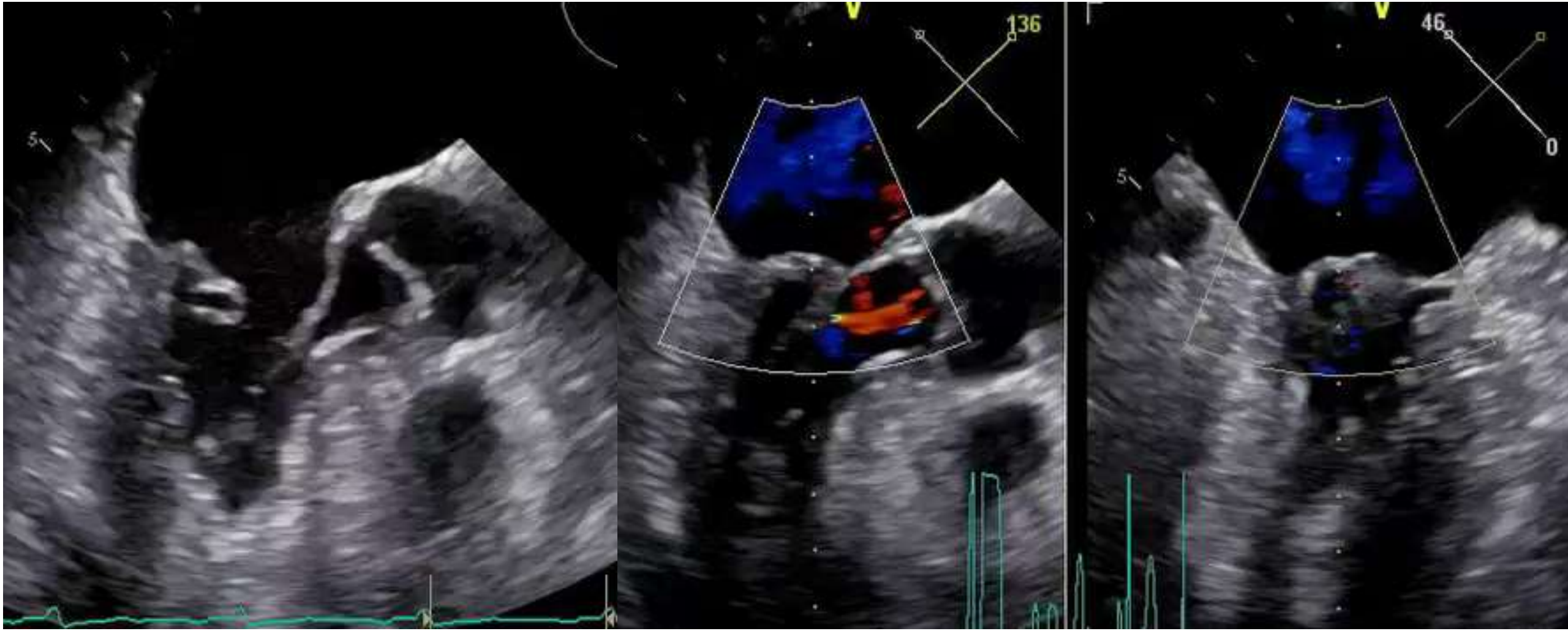
- **80** y/o female patient
- EURO Score 8
- Severe dyspnea
- TTE and
- Don't do this in elderly frail patients - especially not in woman > 80 yrs
- Heart Team decision: Neochord

The Interdisciplinary Heart Team

- One of the greatest innovations in the past decade
- Brings together the experience of different disciplines
  - Unfortunately it also brings together the complications of different disciplines
- But it enables us to do interventions we could not do in the past
- It distributes the responsibilities!
  - Even if you are the primary operator:
    - It is not your fault! Because everything was a heart team decision!

Some minor initial problems

- Anesthetist:
  - "Intubation is somehow difficult"
- Short episode of hypoxemia and blood pressure drop, stable thereafter
- Cardiac surgeon during mini-thoracotomy
  - "Soft tissue – typical elderly woman"
- Very nice family in front of the cathlab
  - "Why does this take so long?"



Severe excentric MR due to P1-P2 prolapse

Insertion of the Neochord delivery instrument

Two chordae implanted

"There is something"

"It's a clot!"

"More bad news"

- Severe bleeding from the insertion site at the LV apex
- Complex repair with multiple sutures and patches
- Finally, hemostasis could be achieved

- Obviously, no additional chordae could be implanted

"Good news!"

"I don't see the clot anymore!"

We had repaired the valve

We had fixed
a severe bleeding complication

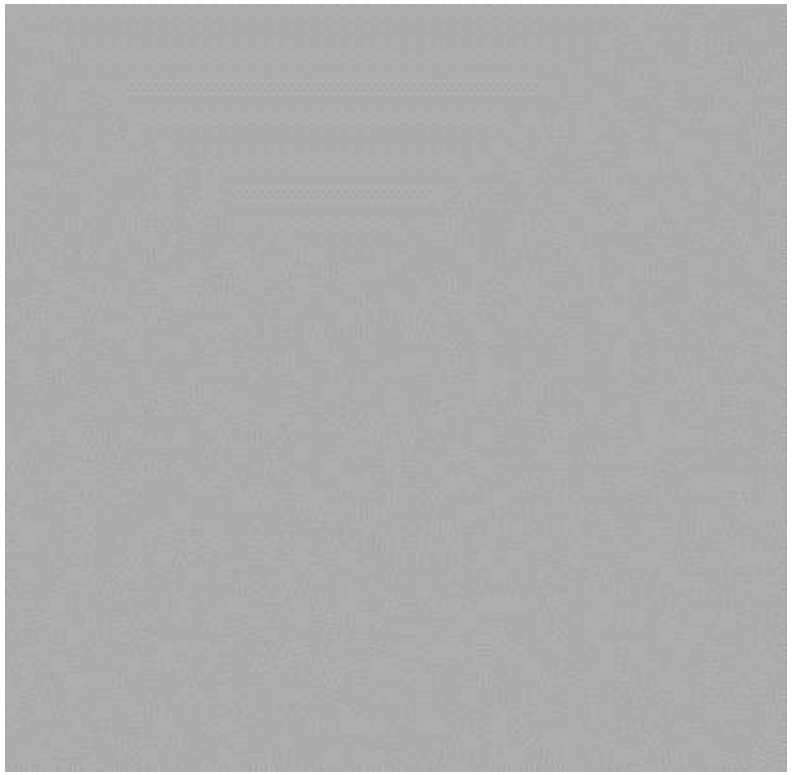
We could not add additional chordae but this should be ok

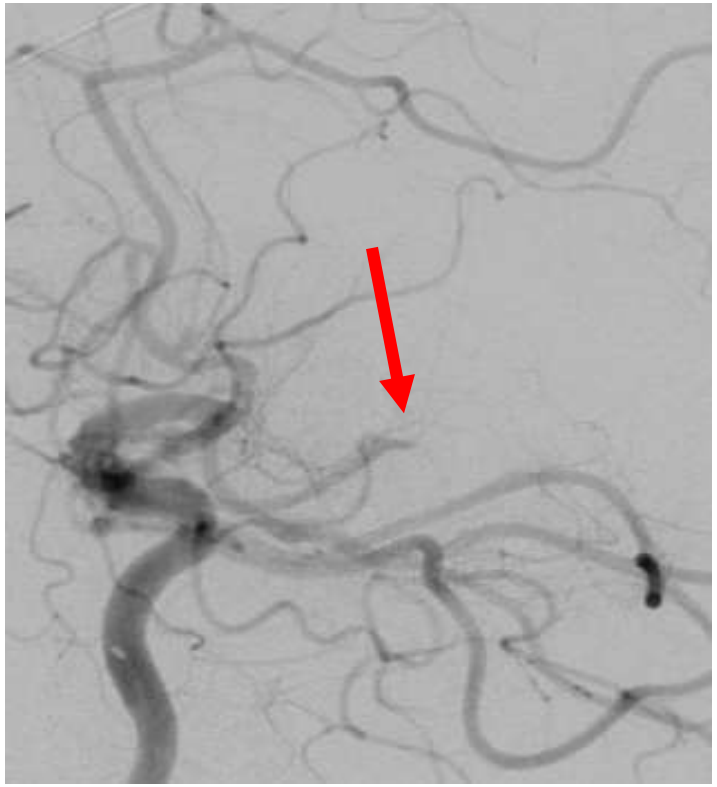
All set?

The Interdisciplinary Heart Team asked itself:

Where is the clot?

Angiogram of the right internal carotid artery (ICA)



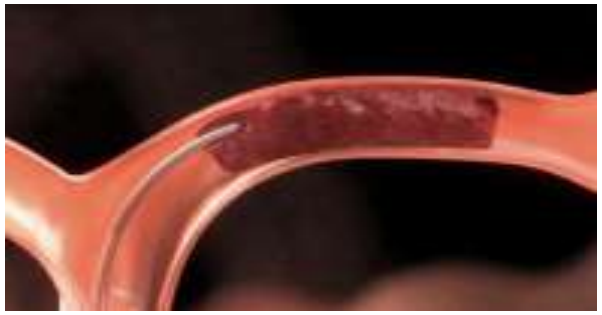


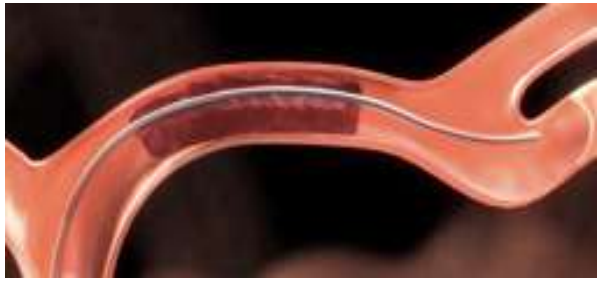
Thrombus in a branch of the right medial cerebral artery

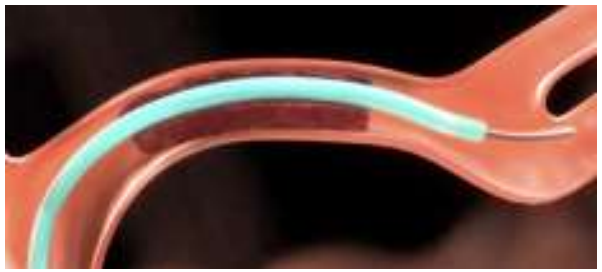
- Stroke neurologist Dr. Neuro came to the cath lab
  - "this will cause a big stroke"
  - "patient is in the time window, so iv lysis is indicated"
- Cardiac surgeon Dr. Surg:
  - "you want to do what?????"
  - "this patient just …"

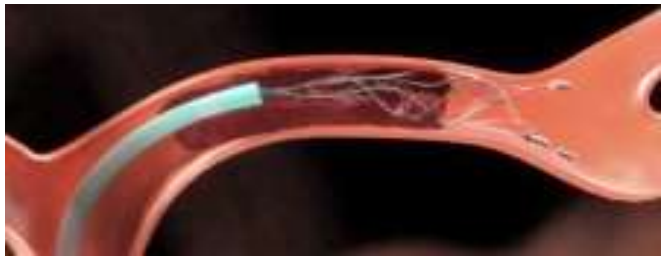
Break through in acute stroke interventions: Stent Retrievers

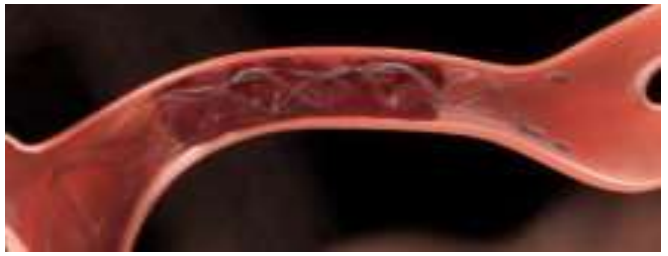
Level I, A











"So please give me a balloon tipped 9F guiding catheter, a microcatheter and a stent retriever"

Cath lab nurse: "Very sorry, but we do not have that"

"Dr. Neuro: What should we do now?"

Dr. Neuro: "According to the guidelines (Level I, A), the patient has to be transferred to a tertiary interventional stroke center for urgent embolectomy!"

Dr. Surg: "You want to do what?????"

"this patient just underwent a very complex surgical procedure …"

Dr. Neuro: "That is no problem! According to the guidelines (Level I, A) we have a contract with a tertiary interventional stroke center nearby. They have an interventional neuroradiologist (Dr. INR) who will come quickly and perform the urgent embolectomy according to the guidelines. Level I, A"

Excellent! Please remind him that he should bring with him a balloon tipped 9F guiding catheter, a microcatheter and a stent retriever

Dr. Neuro called the interventional neuroradiologist Dr. INR: "We have a patient with an acute stroke who can according to Dr. Surg not be transferred. Please come immediately to perform the urgent embolectomy according to guidelines level I, A!"

Dr. INR:

"No, I can not!"

Please ask him that he should please send a balloon tipped 9F guiding catheter, a microcatheter and a stent retriever via taxi

Dr. INR:

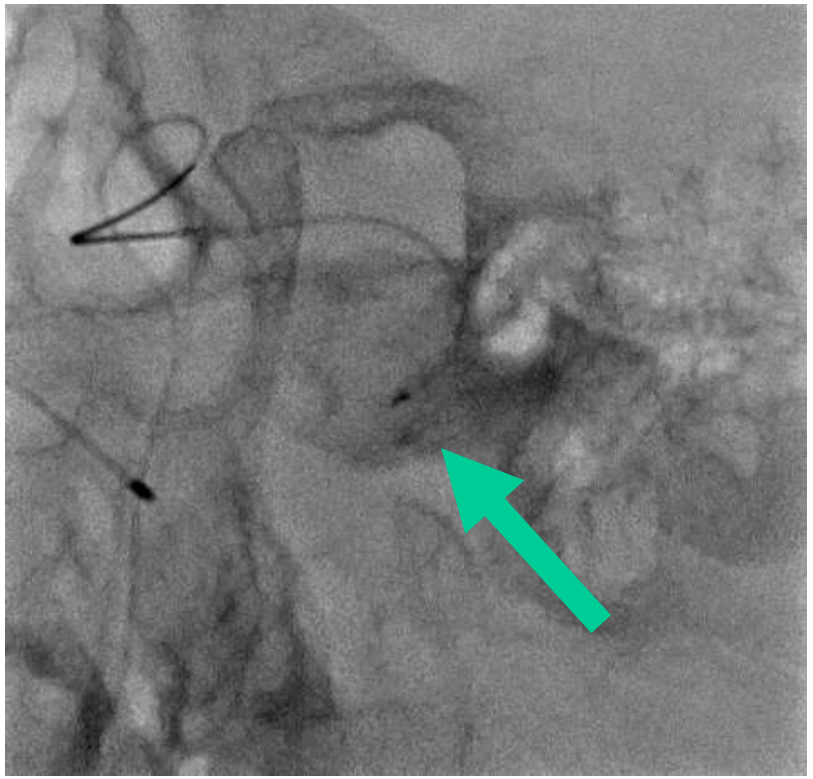
"No, I don't want to do that!"

So please order a balloon tipped 9F guiding catheter, a microcatheter and a stent retriever from our hospital via taxi

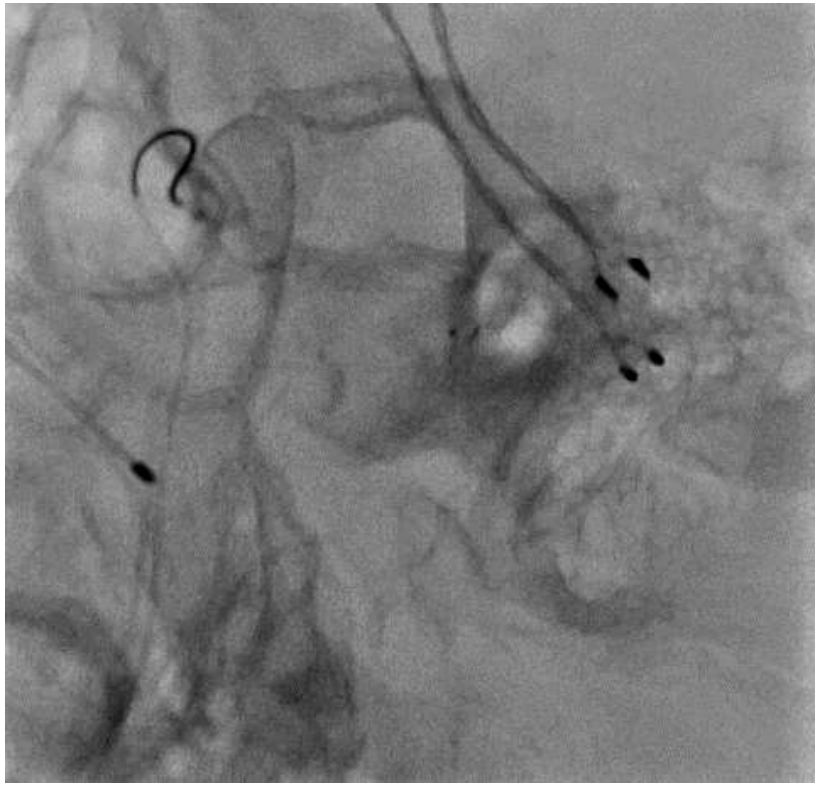
Finally, 1 ½ hours later (sheath in the carotid artery flushed intermittently) a balloon tipped 9F guiding catheter, a microcatheter and a stent retriever arrived from our hospital via taxi ….

… so we could perform the urgent embolectomy according to guidelines level I, A

Angiogram of the right internal carotid artery (ICA)



Stentretriever placement



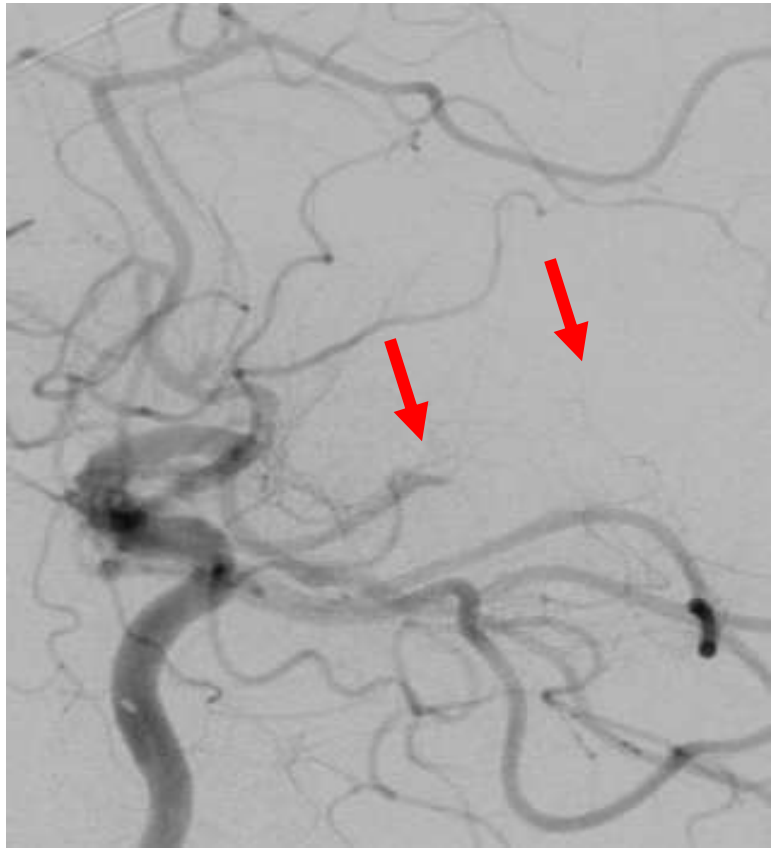
Retrievel of Stentretriever

Small clot for us

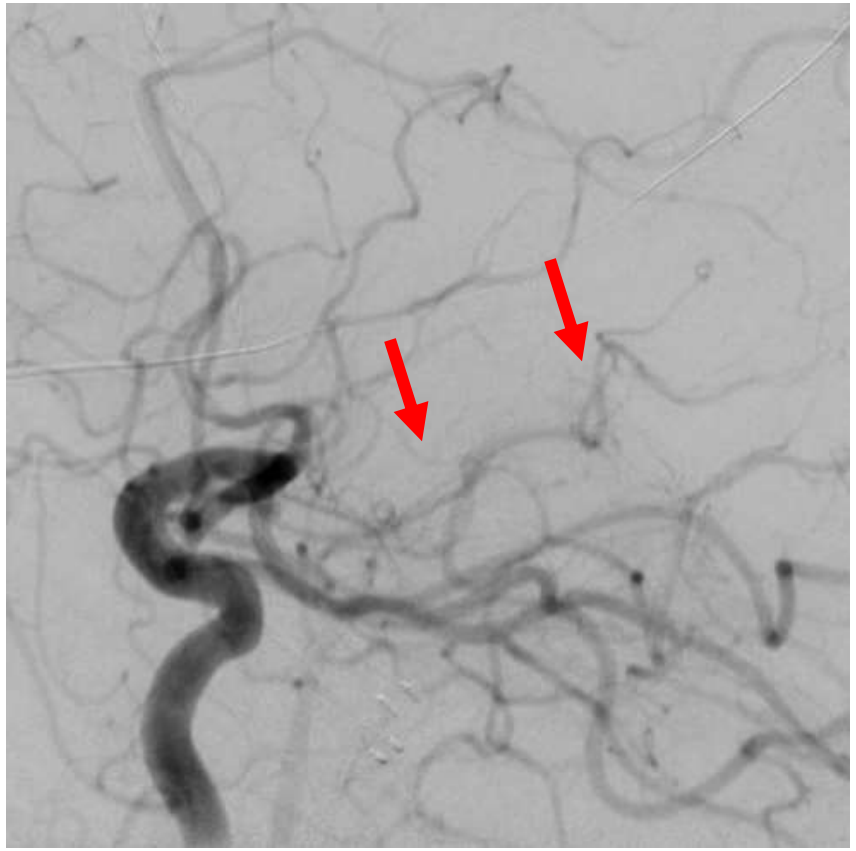
Big clot for the patient

- I thought:
  - Wow! Due to the tortious intracranial vessels this was one of the most difficult embolectomies (level I, A) I have ever done
- Dr. Neuro, who kindly joined me at the cath lab table:
  - "Wow! They never told me that embolectomy is so easy"

Angiogram of the right internal carotid artery (ICA)



Before



After

Discussion with the family in front of the cath lab:

"Severe complications – but it looks like we could fix them"

"Good result regarding the mitral valve"

"We are optimistic"

Unfortunately, this was not the end

- Follow-up CT did not show any stroke signs
- However, during that night the patient (still intubated) suffered from a severe pneumothorax, subcutaneous and abdominal emphysema, caused by a tear in the trachea

Some minor initial problems

- Anesthetist:
  - "Intubation is somehow difficult"
- Short episode of hypoxemia and blood pressure drop, stable thereafter

Unfortunately, this was not the end

- Shock
- CPR, followed by multi-organ failure, brain edema
- Surgical repair of the tracheal tear
- Mediastinitis
- Renal failure, dialysis
- Patient stayed comatose
- Expired on day 12

Lessons (re-) learned

- Small clots can cause a major stroke
  - and many small details can have a major impact on the overall outcome
- The "Interdisciplinary Heart Team" is a new invention
  - but working as a team in the interest of the patient is as old as medicine
- Do never believe that your infrastructure is good enough
- Do never believe that a "team decision" does take away your responsibility

Thank you!

HorstSievertMD@aol.com