

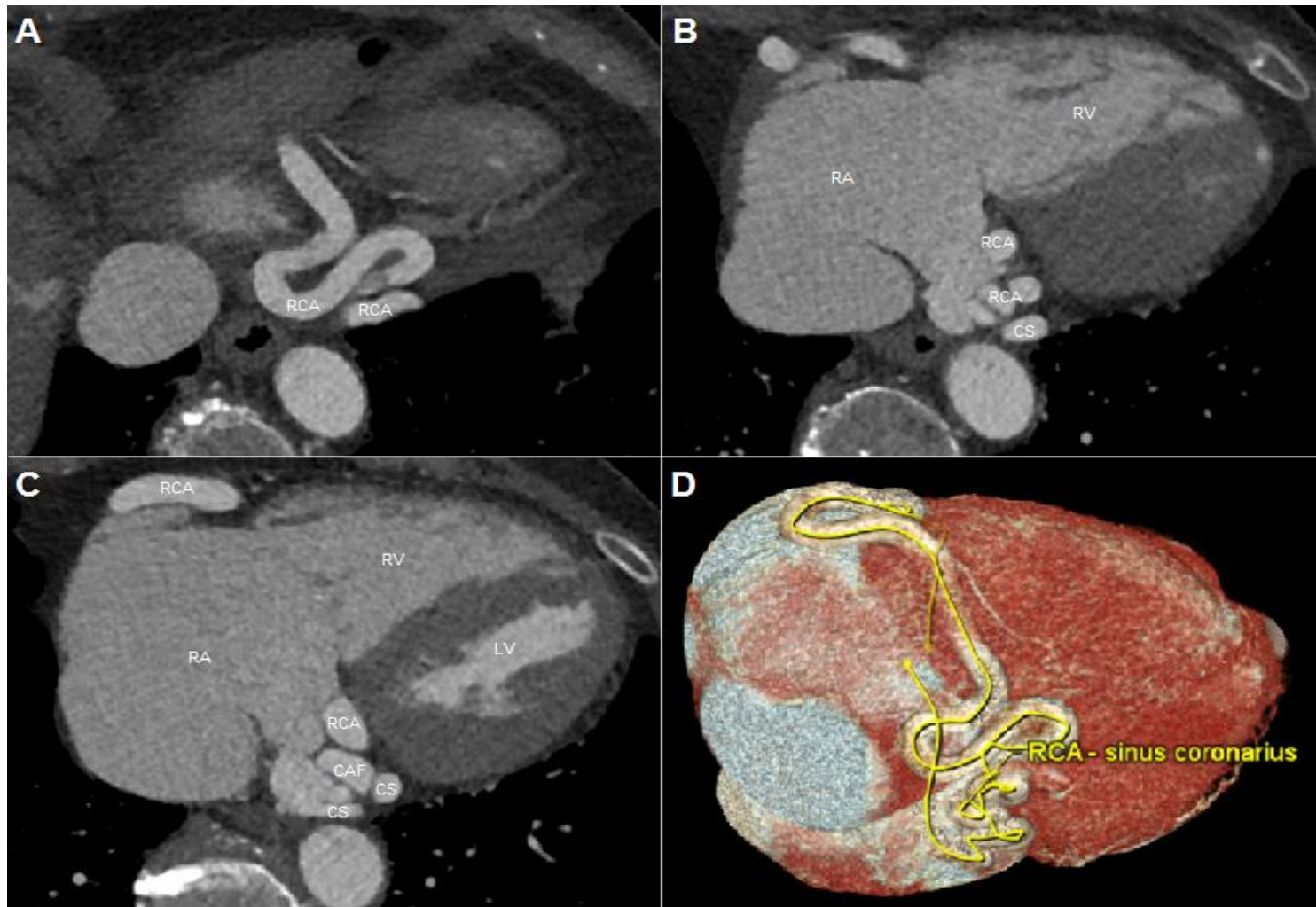


Closing a right coronary artery fistula draining into the coronary sinus using a covered stent

- 68 year-old Dutch female
- Medical history:
 - Atrial fibrillation
- Medical therapy:
 - Dabigatran
 - Metoprolol
- Symptoms:
 - Palpitations
 - Dyspnea
 - Orthopnea
 - Pitting edema of the legs

- Laboratory results:
 - Elevated BNP (353 ng/L, normal value <105 ng/L)
- Transthoracic echocardiogram:
 - Dilated atria, right>left
 - Left ventricular ejection fraction of 39%
 - Dilated right ventricle
 - Severe tricuspid regurgitation
- Computer tomography angiography:
 - Aneurysmatic RCA with a fistula draining into the CS

Image 1: right coronary artery – coronary sinus fistula



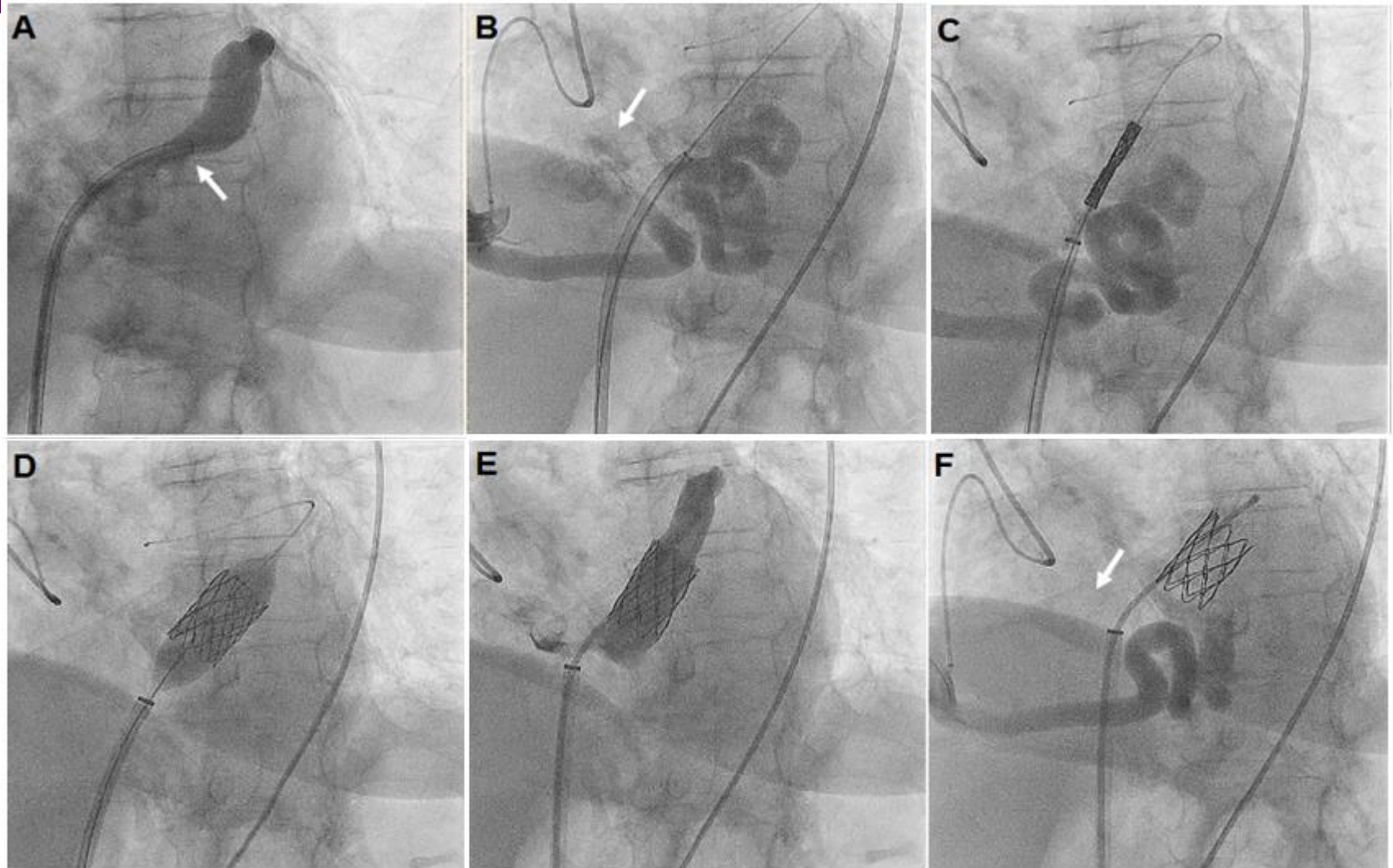
CAF: coronary artery fistula; CS: coronary sinus; LV: left ventricle; RA: right atrium; RCA: right coronary artery; RV: right ventricle

- Severe heart failure symptoms with annulus dilatation and severe tricuspid regurgitation
- Initial treatment:
 - Medical therapy (to optimize for surgical closure):
 - Beta blockers, diuretics and ACE-i
 - Closure of the fistula
 - Tricuspid annuloplasty
- After recompensation, tricuspid regurgitation decreased significantly
- Without the need for tricuspid annuloplasty, transcatheter treatment options became more attractive

- Percutaneous options:
 - Antegrade closure not preferable due to the tortuosity of the RCA
 - Retrograde closure was performed but unsuccessful
 - The coronary sinus appeared to be compressed by convolutes of the fistula
- It was decided to close the fistula with a covered stent

- Percutaneous closure with a covered cp stent 28mm (NuMED Inc.)
- Introduced through 12F right femoral vein guiding catheter
- Placed in the CS at the edge of the outlet into the right atrium
- Deployed with a 16mm balloon-in-balloon
- Two issues were resolved:
 - Compressed part of the CS was dilated
 - Exit of the fistula between the RCA and CS was sealed off and thus closed

Image 2: procedure of percutaneous closure



A: coronary sinus with compressed outlet into right atrium (arrow) and dilated distal part. B: tortuous right coronary artery with fistula draining into the coronary sinus, seen as contrast staining in the right atrium (arrow). C, D: positioning and deployment of the Covered CP Stent in the coronary sinus. E: result of the Covered CP Stent with removal of the compressed outlet of the coronary sinus. F: result of the Covered CP Stent with closure of the fistula, seen as no contrast in the coronary sinus and no contrast staining in the right atrium (arrow).

- Coronary artery fistula (CAF) is a rare anomalous connection with a large anatomical variance
- Majority is asymptomatic
 - Myocardial ischemia (coronary steal phenomenon)
 - Volume overload (heart failure signs)
- Treatment differs
 - Medical therapy, surgical or percutaneous options
- Percutaneous closure vs surgical closure
 - Avoidance of sternotomy/thoracotomy, cardiopulmonary bypass and procedural related risks
- To our knowledge, this is the first report of a percutaneously closed fistula between the RCA and CS with a covered stent

- Follow up (4 months):
 - The patient was symptom-free and her overall condition improved mildly.
 - No complications were reported
- Learning objectives:
 - Coronary artery fistulae (CAFs) can remain asymptomatic for a long period of time but can eventually become a significant burden resulting in heart failure
 - Transcatheter closure of symptomatic CAFs should be preferred over surgical closure if technically feasible with acceptable risk
 - The possibility to use covered stents to close fistulae by deployment in the drainage site instead of the feeding artery