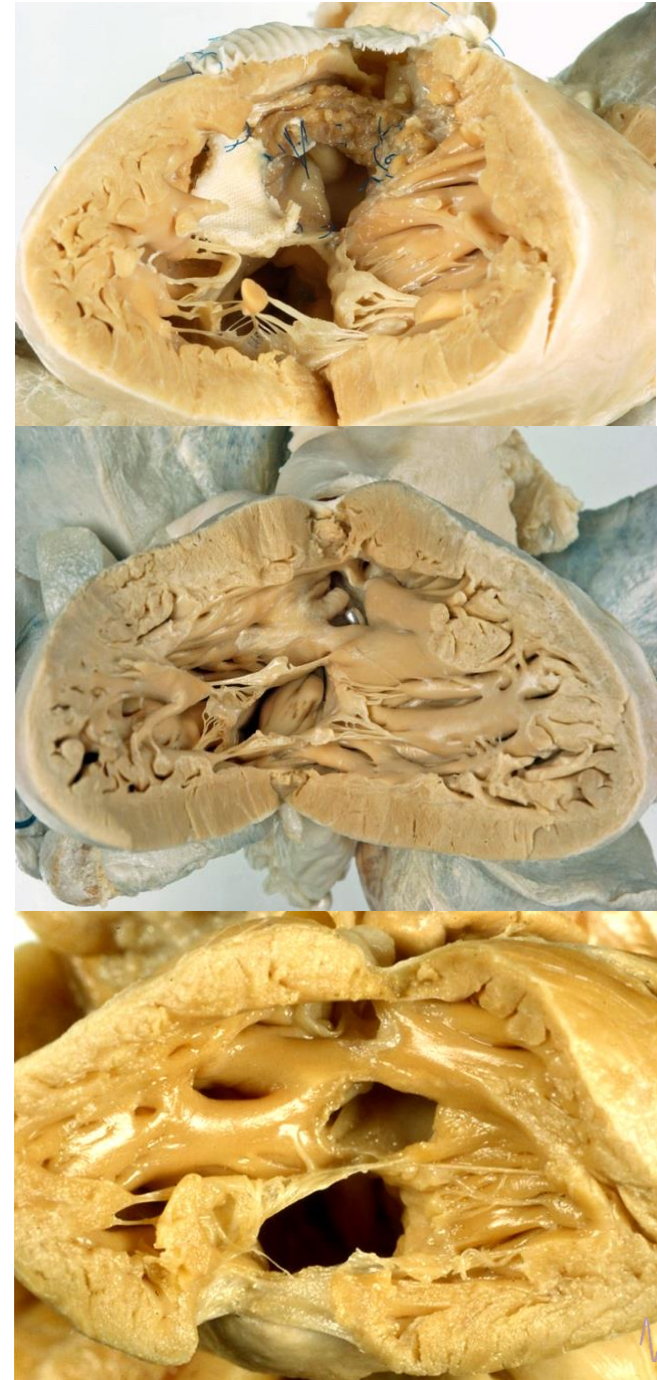


Boezemflutter na een hartoperatie op jonge leeftijd

Charlotte Brouwer

PhD student Elektrofysiologie bij aangeboren hartafwijkingen

Leids Universitair Medisch Centrum





HART LONG
CENTRUM LEIDEN

Introductie

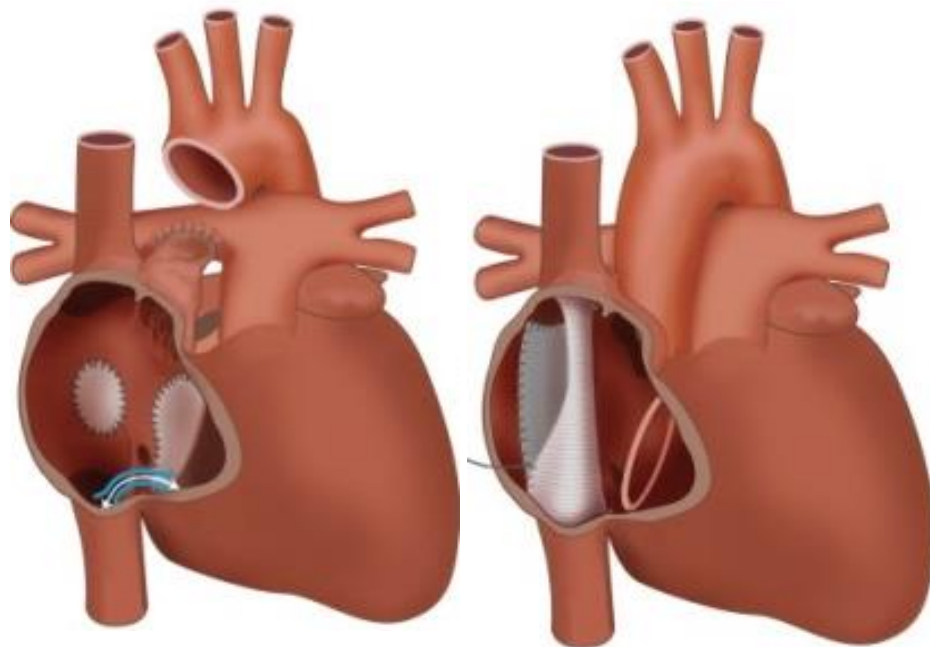
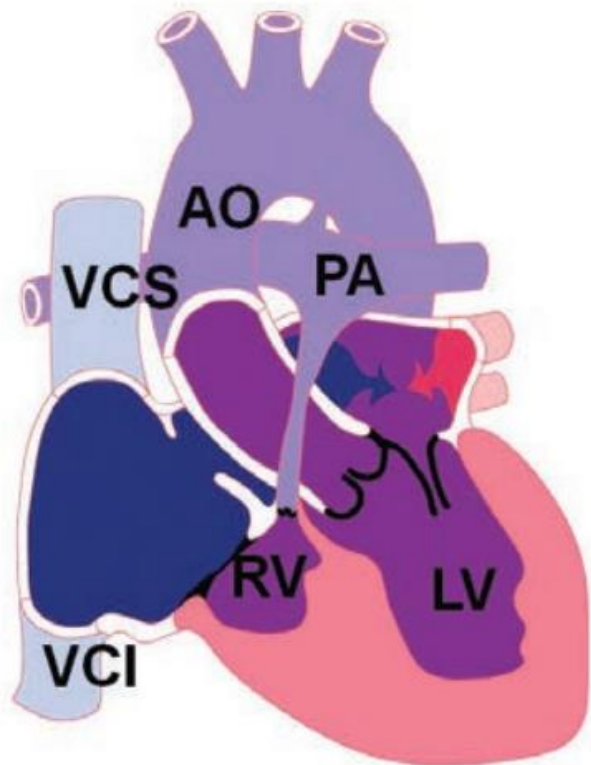
Introductie

Toename overleving bij aangeboren hartafwijkingen

Meer risico op late complicaties -> ritmestoornissen

Ritmestoornissen leiden tot morbiditeit en mortaliteit

Incidentie van ritmestoornissen



Risico op boezemflutter

Neemt toe met:

- Complexiteit van de aandoening
- Aantal chirurgische procedures
- Langere tijd na operatie

Type aangeboren hartafwijking	Risico op Aflut
ASD	++
VSD	+
TOF	++
TGA (atrial switch)	+++
Fontan classic	+++
Fontan extracardiale tunnel	+



HART LONG
CENTRUM LEIDEN

Mechanismen

Intra-atriale reentry tachycardie = boezemflutter

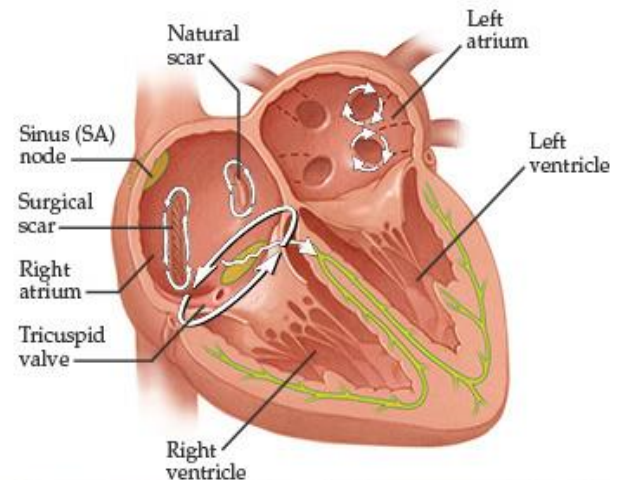
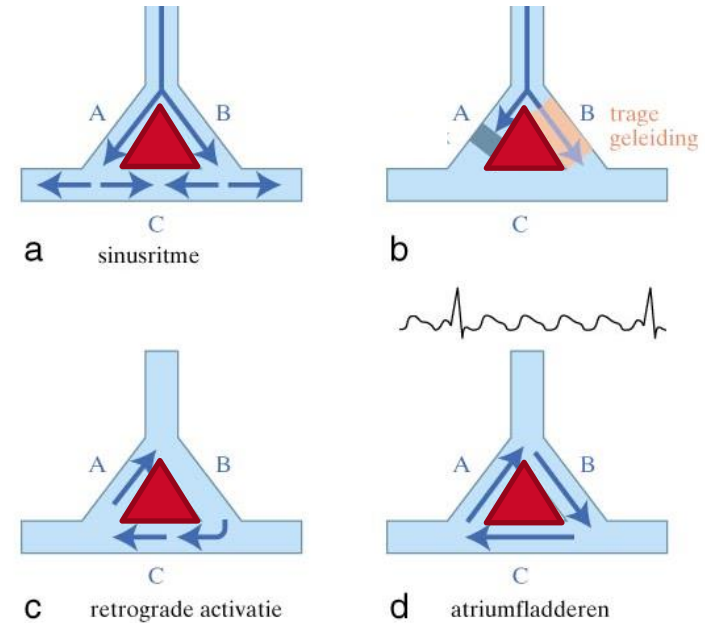
Mechanisme

Niet-geleidende obstakels:

- Anatomische structuren
- Chirurgische incisies
- Kunstmateriaal

Trage geleiding door:

- Volume/druk overbelasting
- Veroudering

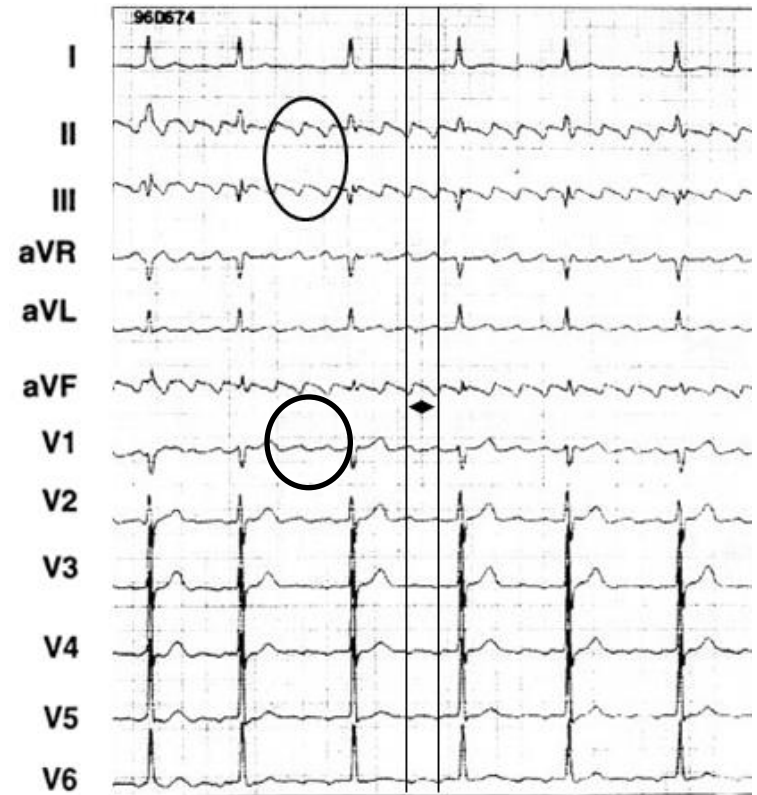
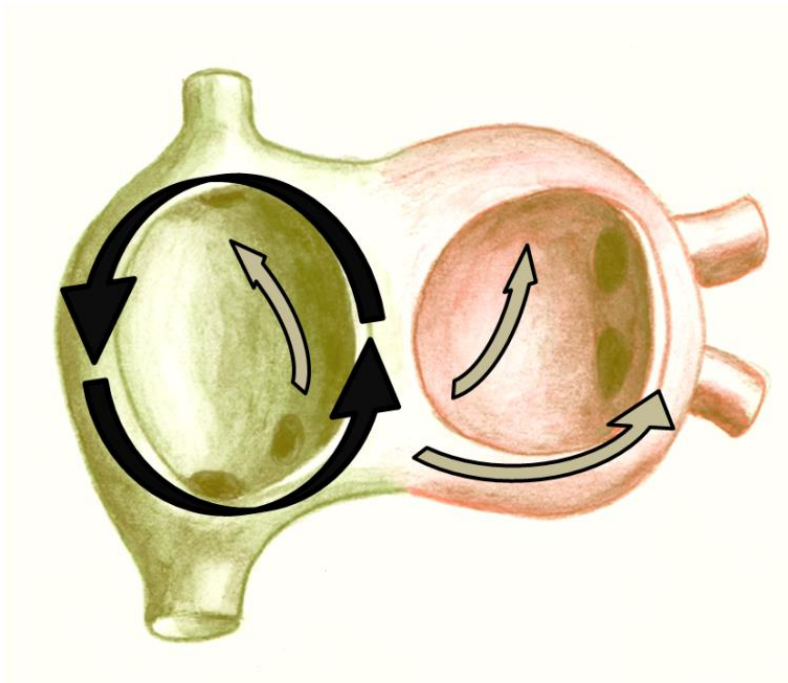


Intra-atriale reentry tachycardiën

Typische atriumflutter (40-60%)

cavotricuspide isthmus

250-280 bpm



Atrial CL 240ms = 250 bpm

Intra-atriale reentry tachycardiën

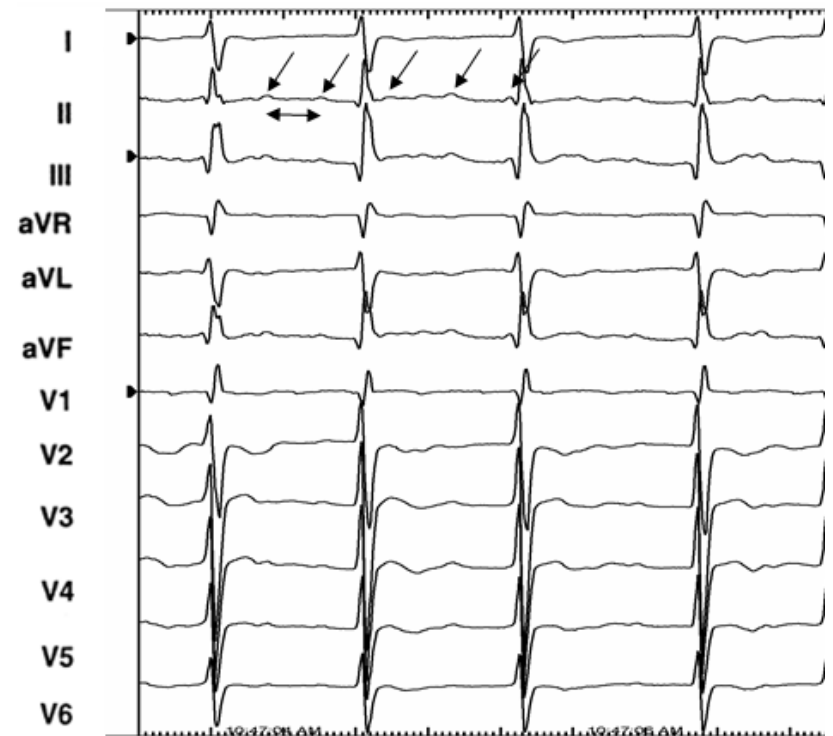
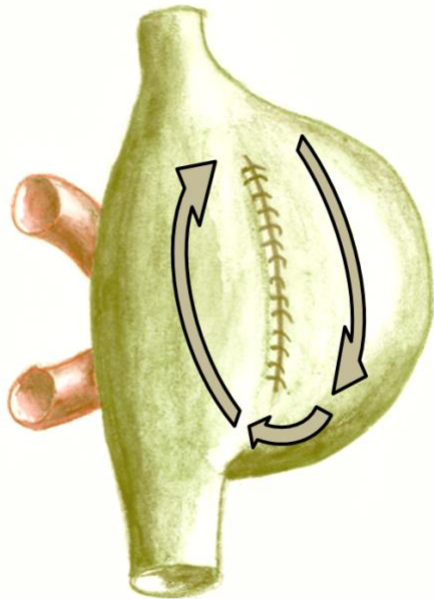
Atypische atriumflutter (20-40%)

gebied van littekenweefsel

andere anatomische structuren

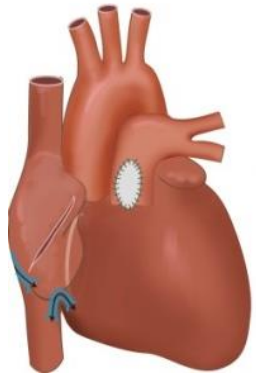
barrières door eerdere operatie

150-250 bpm



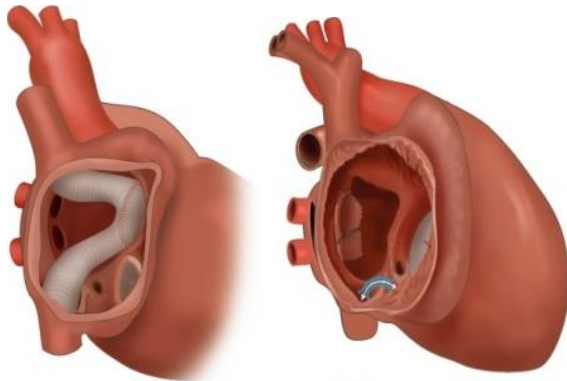
Atrial CL 340ms = 180 bpm

Type boezemflutter per aangeboren hartafwijking



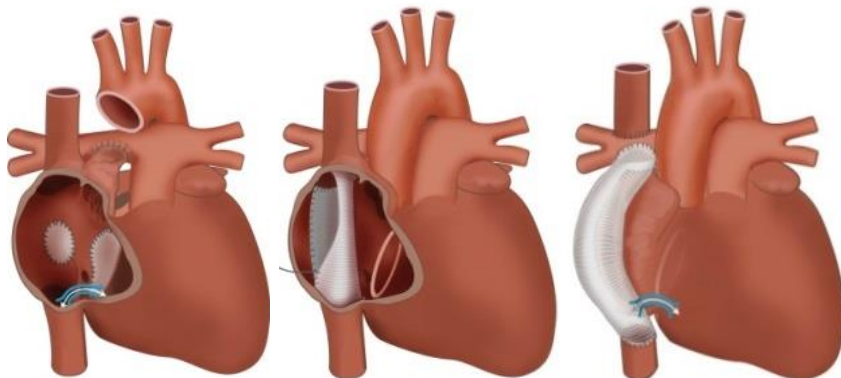
Laterale incisie

1. Typische flutter: > 50%
2. Atypische flutter rond litteken in RA : 20-30%



Transpositie van de grote vaten

1. Typische flutter: >50%
2. Atypische flutter in beide delen van boezem



Univentriculair hart

- Klassiek: atypische flutter multipele circuits
Laterale/extracardiale tunnel: atypische flutter rondom vena cava inferior



HART LONG
CENTRUM LEIDEN

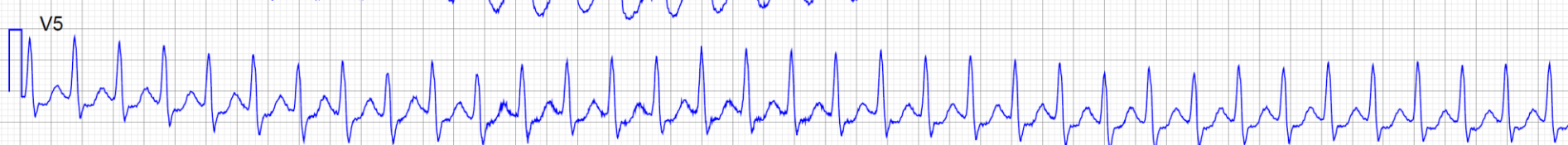
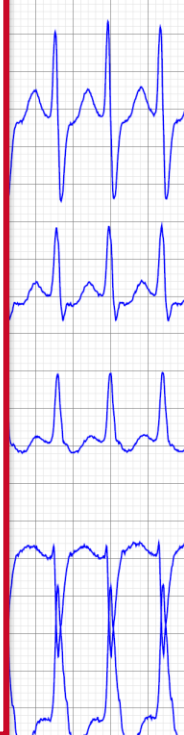
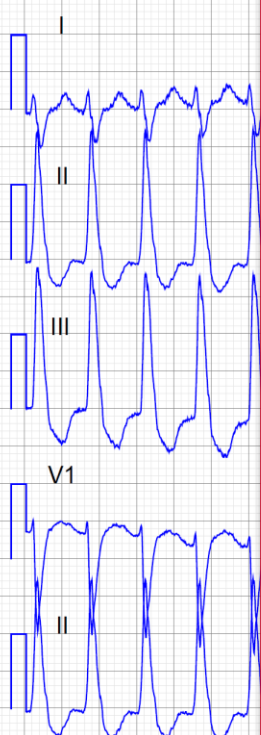
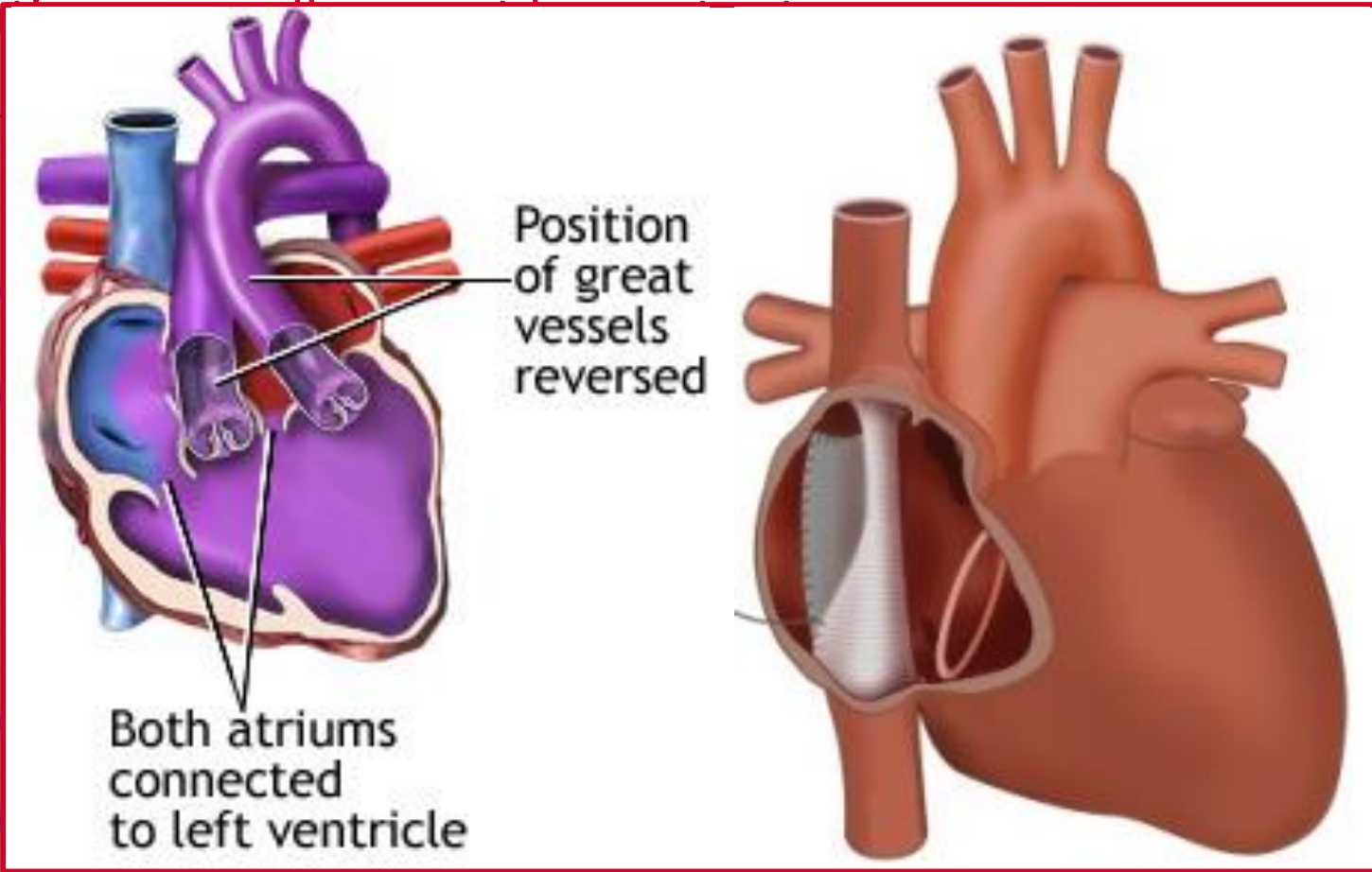
Klinische presentatie

Casus 1 | ♂ | 27 jaar

Double inlet LV met Fontan en laterale tunnel

Presentatie

Klinische A

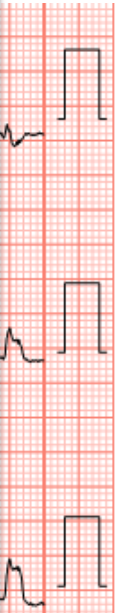
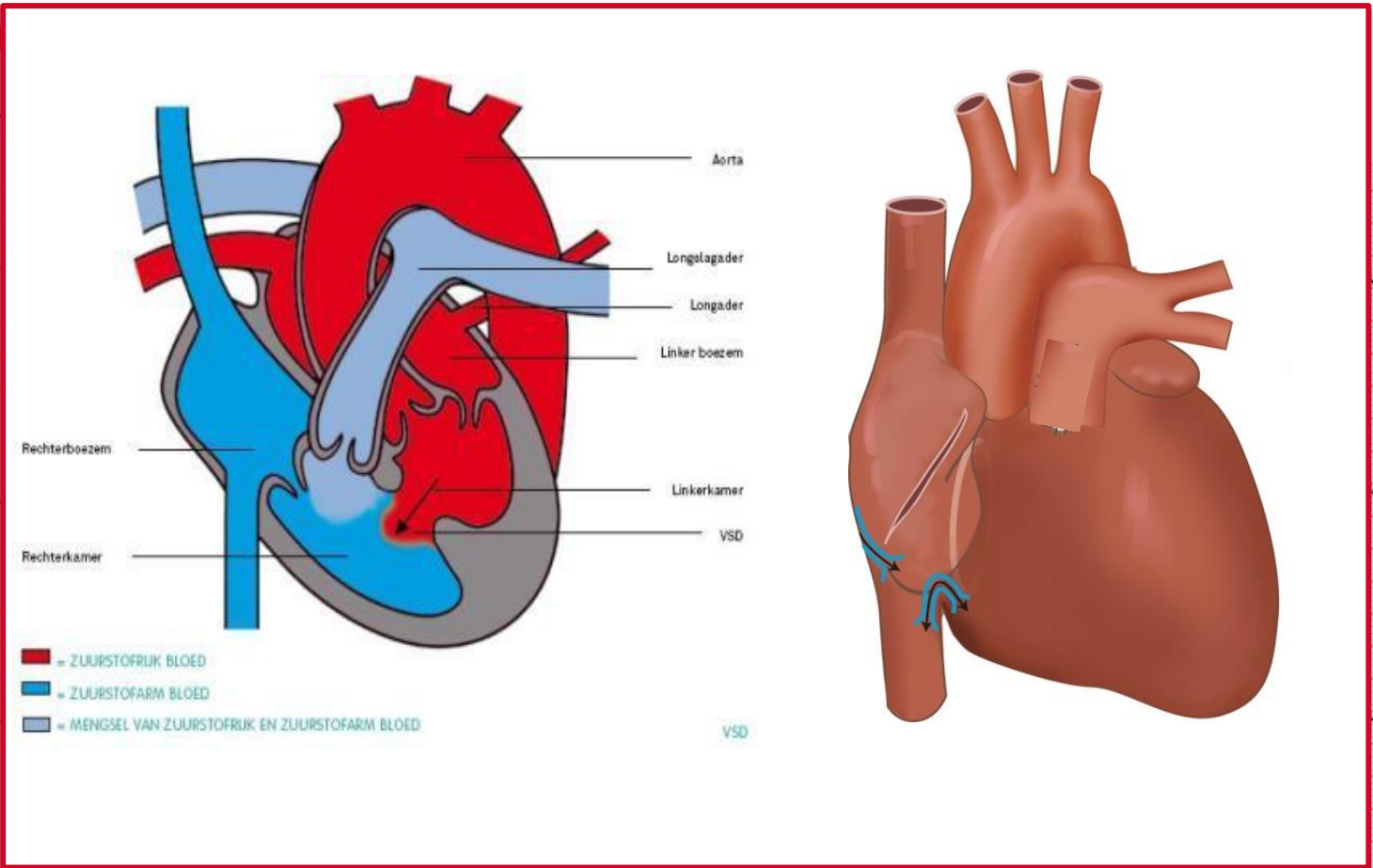


Casus 2 | ♀ | 43 jaar

VSD waarvoor chirurgische sluiting, DDD-pacemaker bij totaal AV-blok

Presenta

Klinische A



Mortara el250-20901

25 mm/s

10.0 mm / mV

0.05 - 150 Hz



HART LONG
CENTRUM LEIDEN

Beleid

Acuut

Elektrische cardioversie

Anterior-posterior, 1-2 J/kg (kinderen) of 200J (volwassenen)

Overdrive pacing

Cave: indien > 24h en geen antistolling of bij onduidelijke duur: eerst TEE

Chronisch

Evaluatie hemodynamische toestand

Elektrische cardioversie

Weinig frequente en goed verdragen episoden

Ritme controle

Klasse I of III anti-aritmica

Automatische anti-tachycardie pacing

Fontan conversie met chirurgische MAZE

Catheterablatie

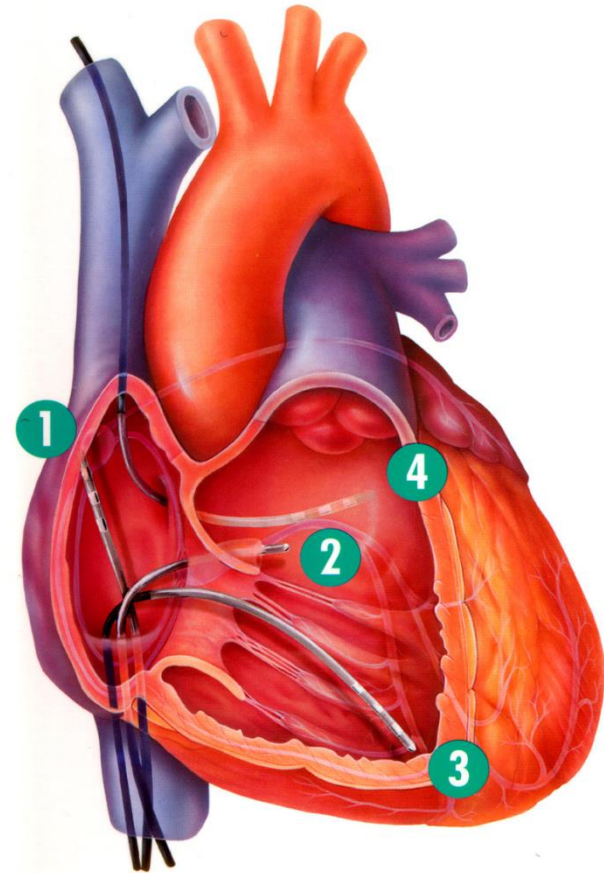
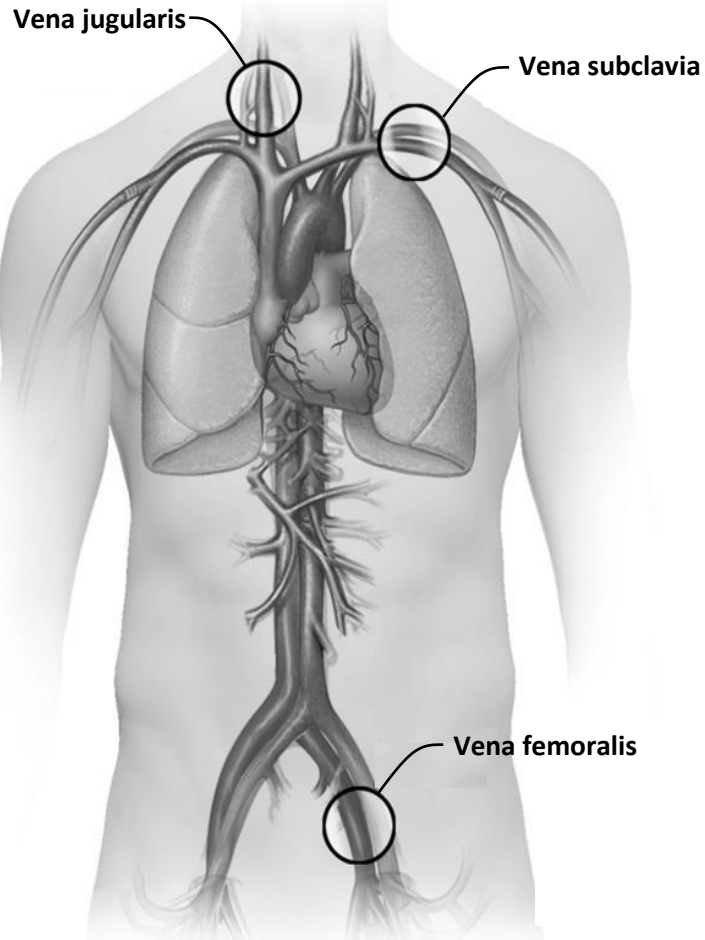


HART LONG
CENTRUM LEIDEN

Catheterablatie

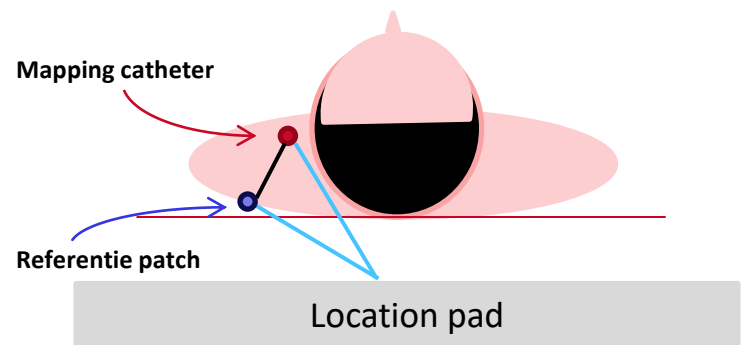
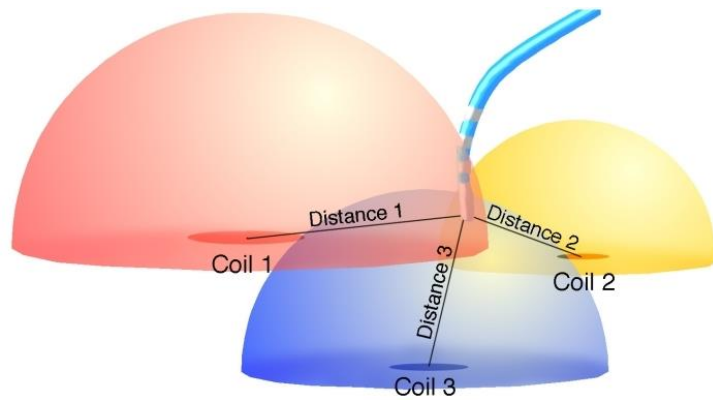
Catheterablatie basisprincipes

Toegang



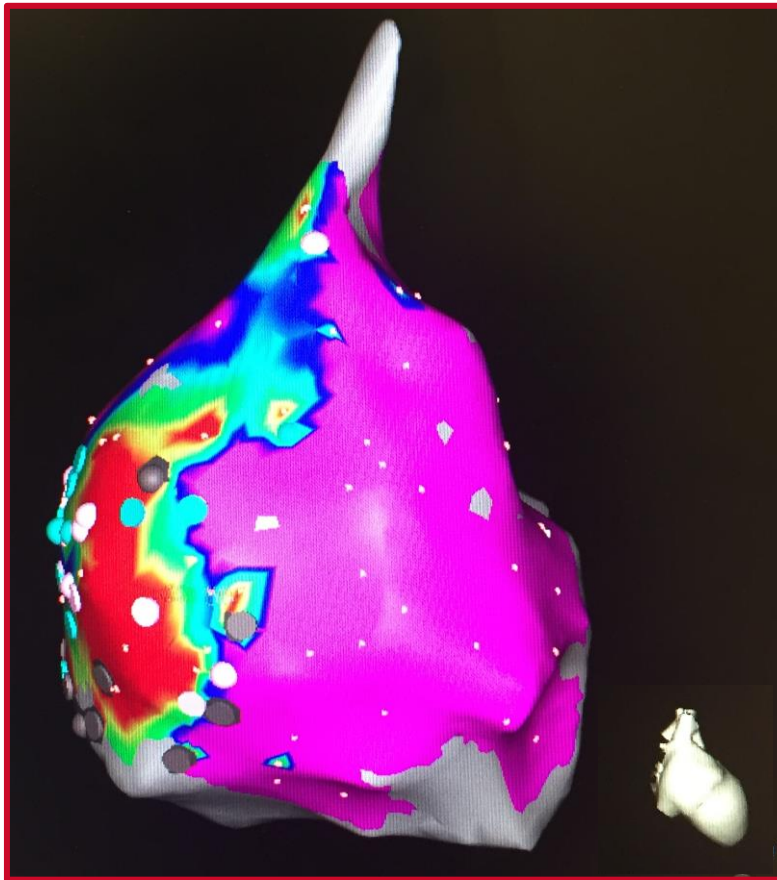
Catheterablatie basisprincipes

Electroanatomical mapping

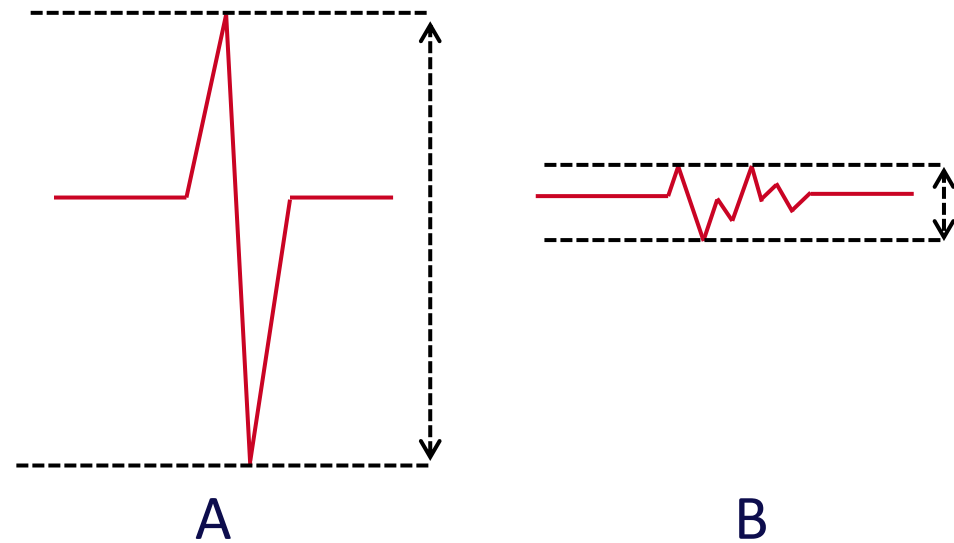


Catheterablatie basisprincipes

Voltage map

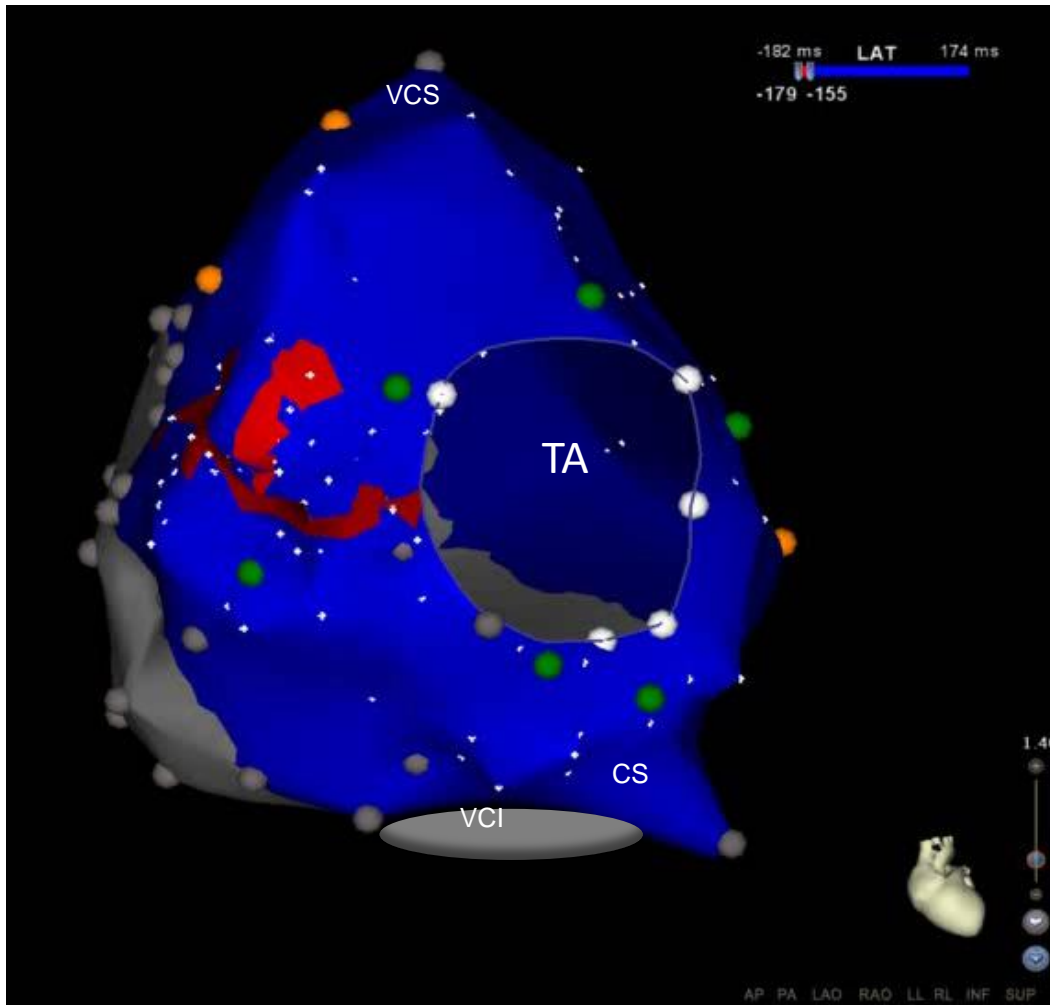


Intracardiale signalen



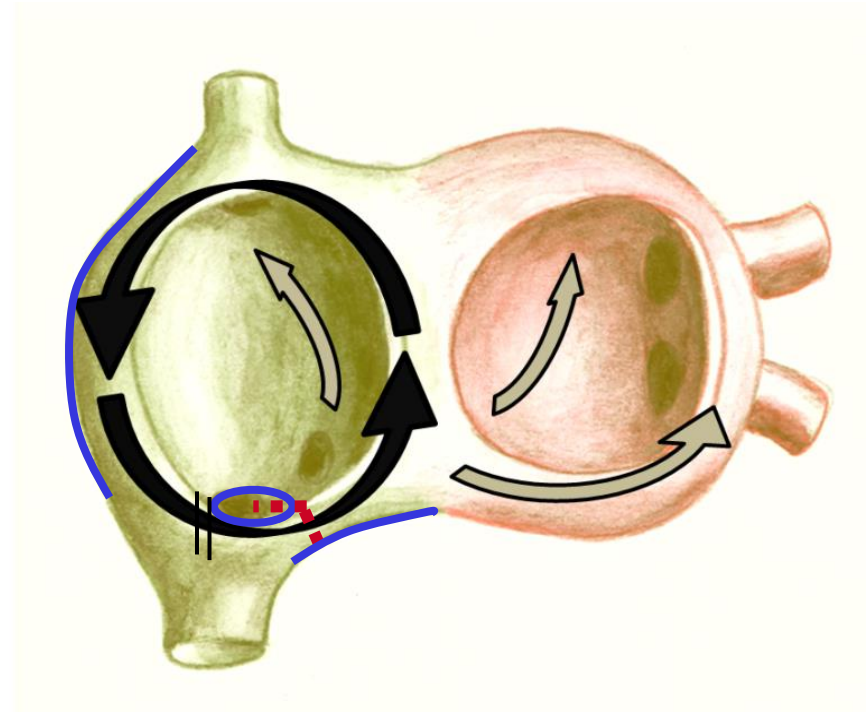
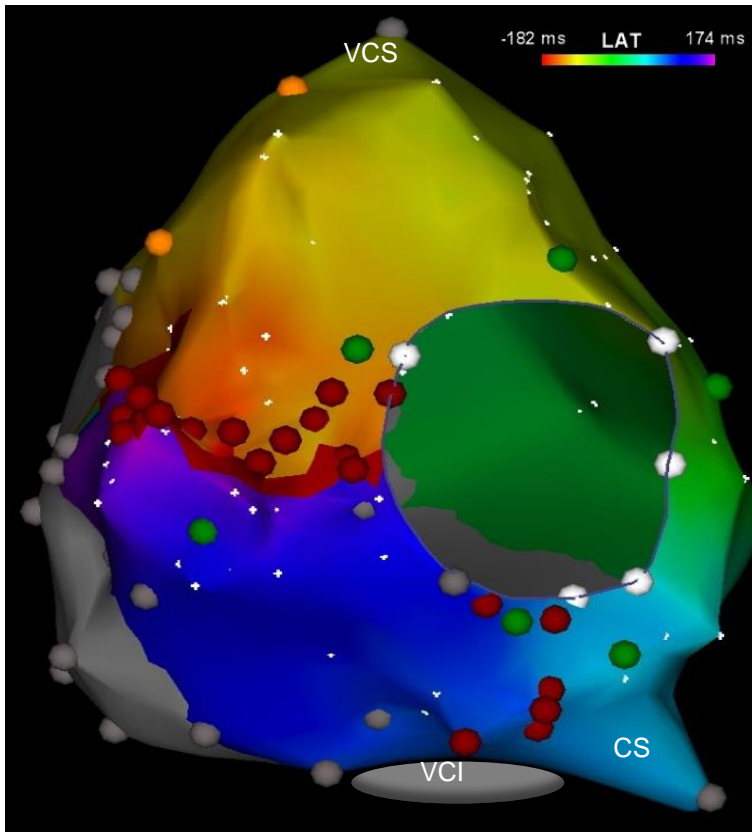
Catheterablatie basisprincipes

Activatie map



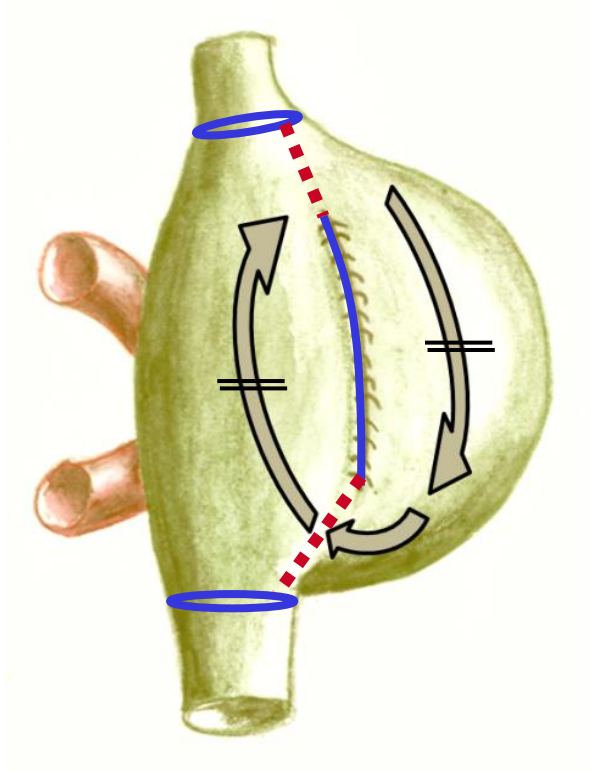
Catheterablatie basisprincipes

RF ablatie bij IART

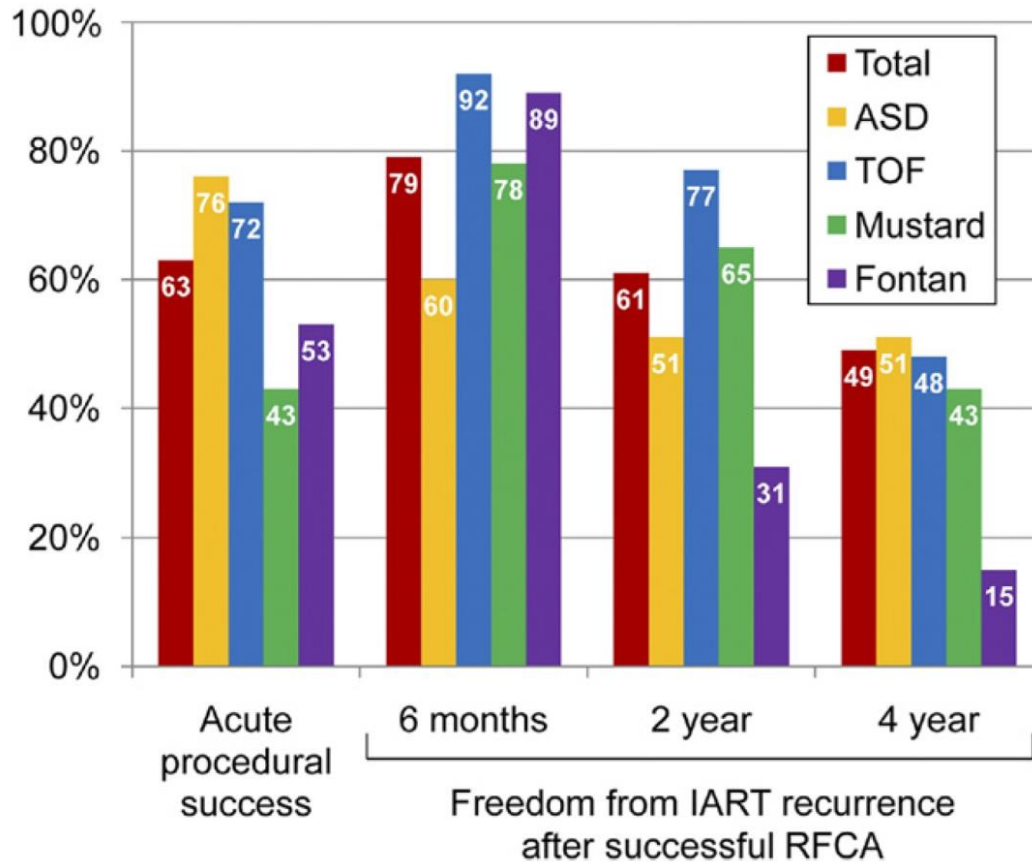


Catheterablatie basisprincipes

RF ablatie bij IART



Resultaten van IART catheterablatie



RF ablatie van CTI flutter bij anatomisch normale harten

Acute success: 90-93%

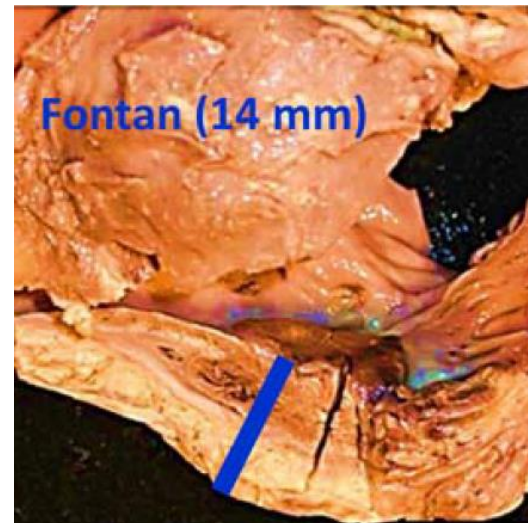
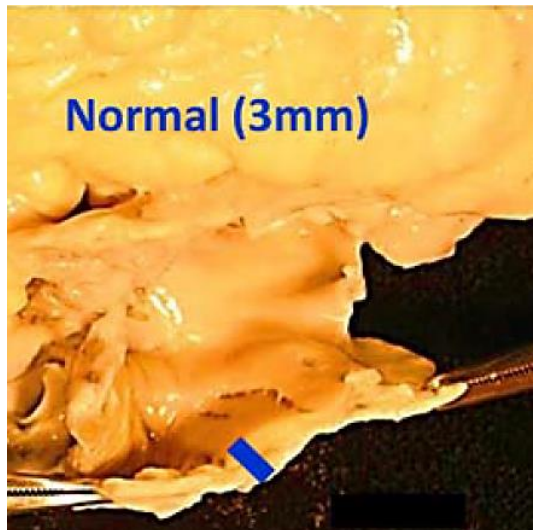
Freedom from recurrence: 88-97%

Resultaten van IART catheterablatie

Author, year	City	Year of inclusion	CHD type (n)	Method	Imaging	Patients, no	AT, no	AT, mean cl	AT type (n)	Acute success (%)	Definition endpoint	Recurrence after any (successful ablation (%)	Mean FU time (months)													
Correa, 2015	Boston, MA	2006-2012	Fontan (52) Extracard. (4) Intracard. (48)	AM	ICE	52	80	312	CTIDF (14) IART (11) fAT (8) Other (21)	CTIDF: 100 IART: 81 fAT: 100 All: 84	TDA + NI	50(16)	18													
Correa, 2013	Boston, MA	2006-2010	Fontan Classic (52) Modern (37) TGA Mustard (16) Senning (13)	NP	-	90	170	NP	IART (78) fAT (22) Other (70)	81	NI and/or DB (not specified)	30(NP)	12													
Ueda, 2013	<p style="font-size: 2em; color: blue; text-align: center;">Patiënten: ASD tot Fontan</p> <p style="font-size: 3em; color: blue; text-align: center;">Acute succes percentages: 55 – 95%</p> <p style="font-size: 3em; color: blue; text-align: center;">Recidiefkans: 9-57%</p>																									
Akca, 2012																										
Mah, 2011																										
De Groen, 2010														Netherlands		Ebstein (1), Fontan(14), TGA (4), TOF (10), Valvular(9), VSD (2)					309 (IART) 380 (fAT)	IART (22) fAT (5)	IART: 55 fAT: 100	IART/fAT: TDA		
Yap, 2010														Toronto, Canada	1993-2009	ASD (21), AVSD (9), Fontan (21), Other (14), TGA (21), TOF (18), VSD (5)	AM, SM, LL	-	130	118	NP	IART	63	TDA, NI	57(48)	40
Wu, 2010	Munchen, Germany	2006-2008	ASD (2), Ebstein (1), Fontan (9), Mustard (2), Senning (4), cc-TGA (1), TOF (2)	RMN AM	-	22	26	321	CTIDF (8) IART (14) fAT (2) other (2)	95	TDA (TGA) NI (Fontan) DB (simple CHD)	9(NP)	8													
Peichl, 2009	Prague, Czech Republic	2004-2007	TGA (4), Fontan (3)	AM, SM	ICE	7	12	320	CTIDF (4) IART (6) fAT (2)	100	DB (CTIDF)	28(NP)	23													
Liew, 2008	London, UK	2002-2007	APV (1), ASD (9), TGA (1), TOF (1)	AM, SM	-	12	12	NP	CTIDF (1) IART (9) fAT (1) Other (1)	88	TDA, NI DB (linear lesions)	33(36)	26													

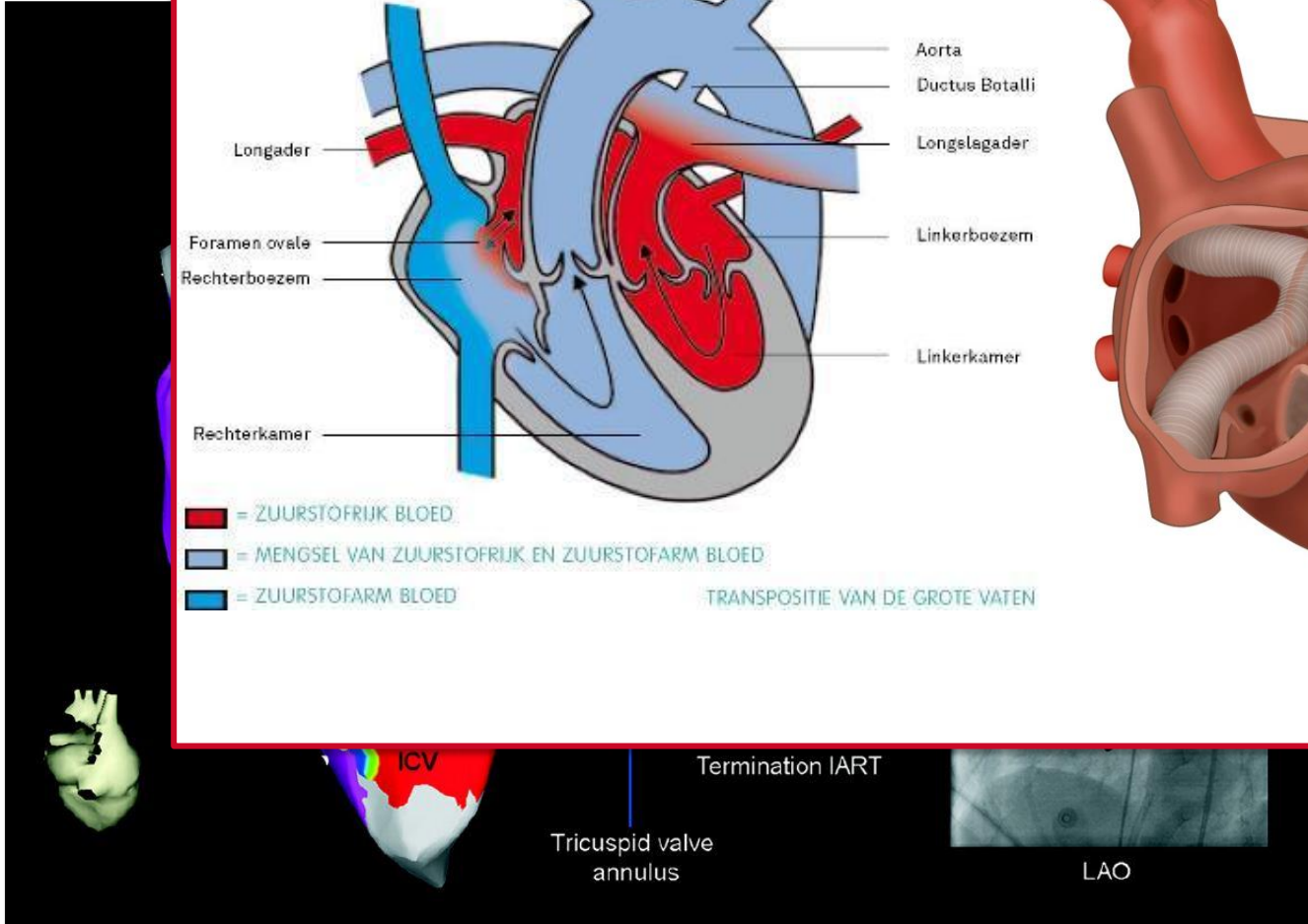
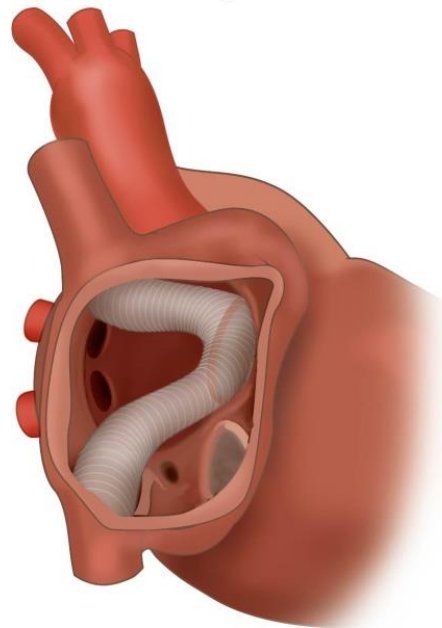
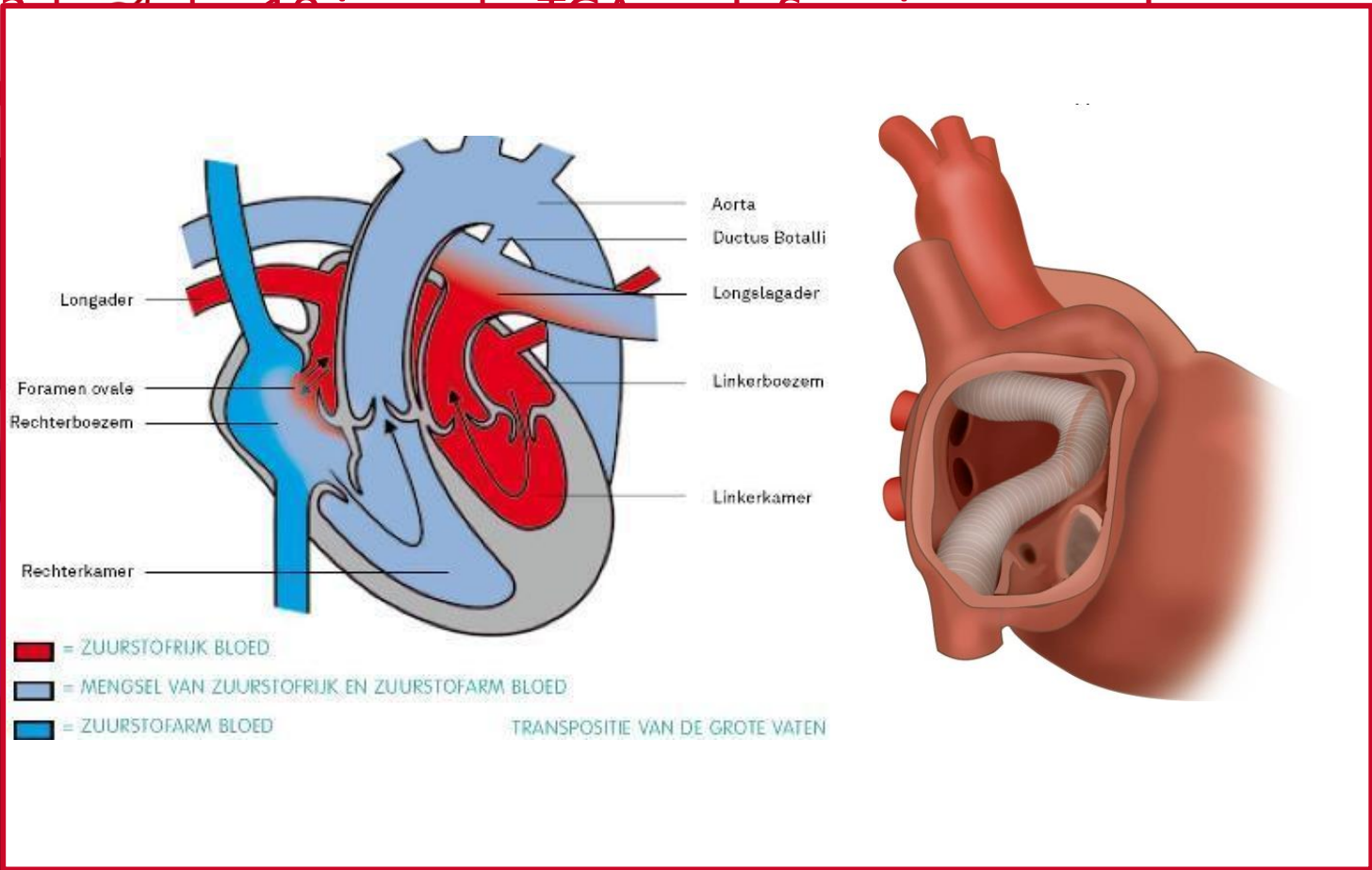
Uitdagingen: moeizame laesievorming

Verschil in wanddikte

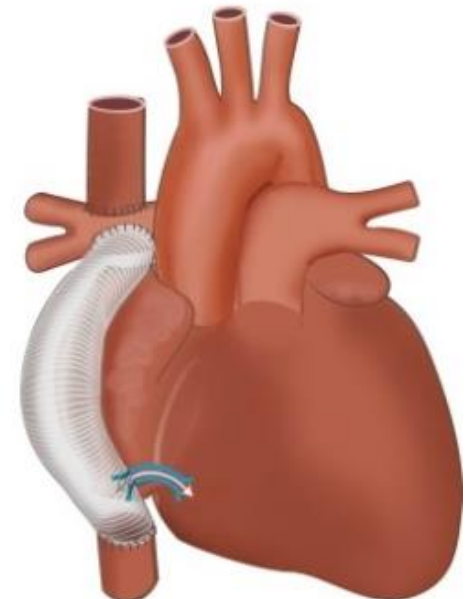
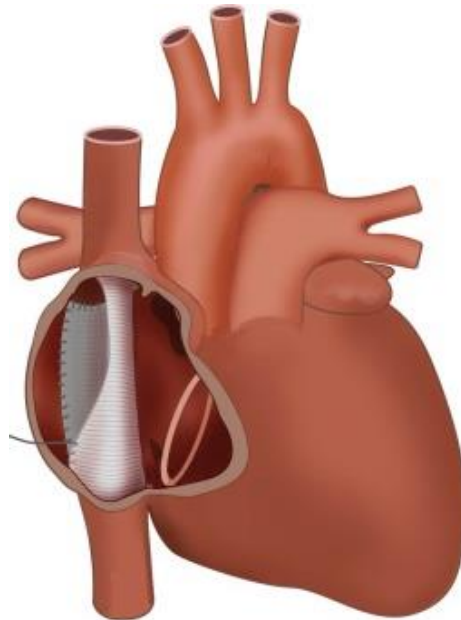
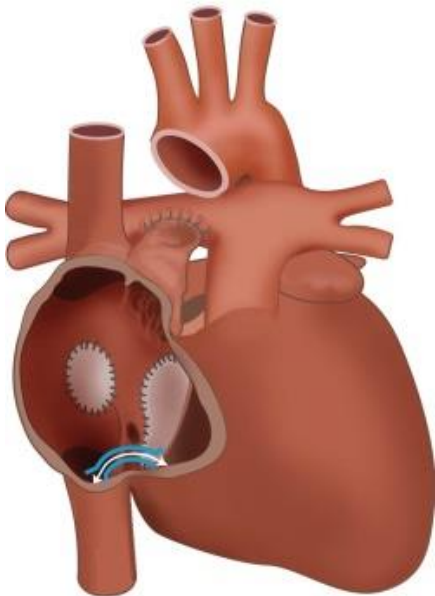
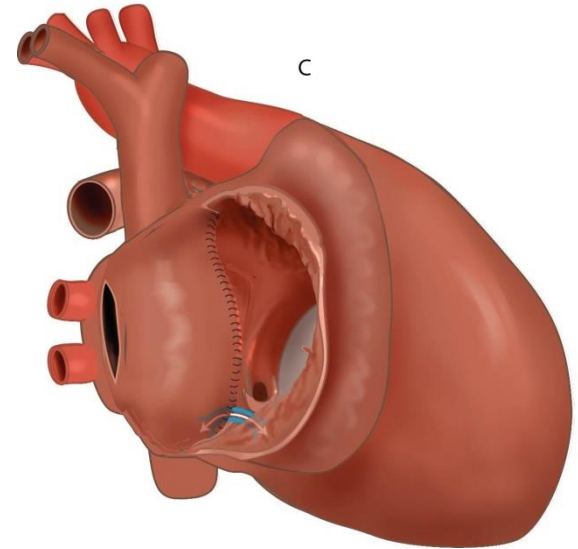
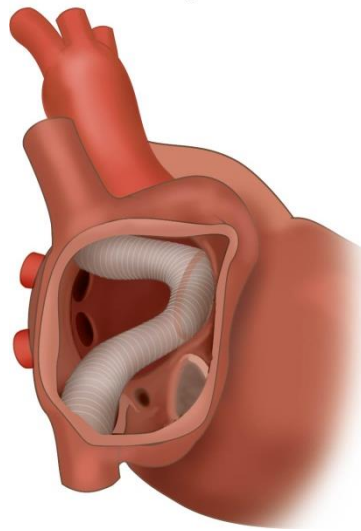
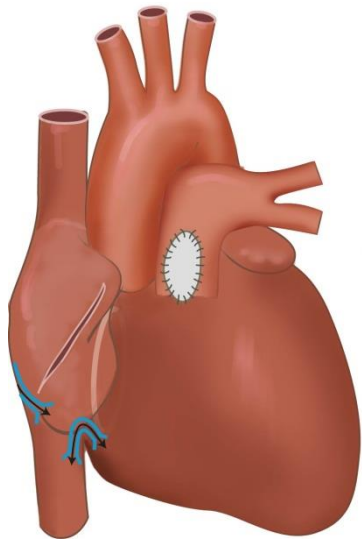


Uitdagingen: gelimiteerde toegang

Casus
Hemo



Uitdagingen: gelimiteerde toegang

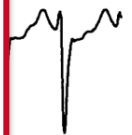
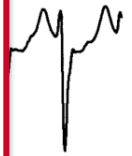
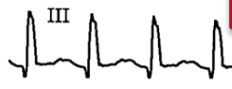
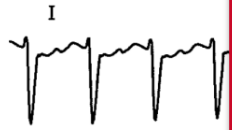
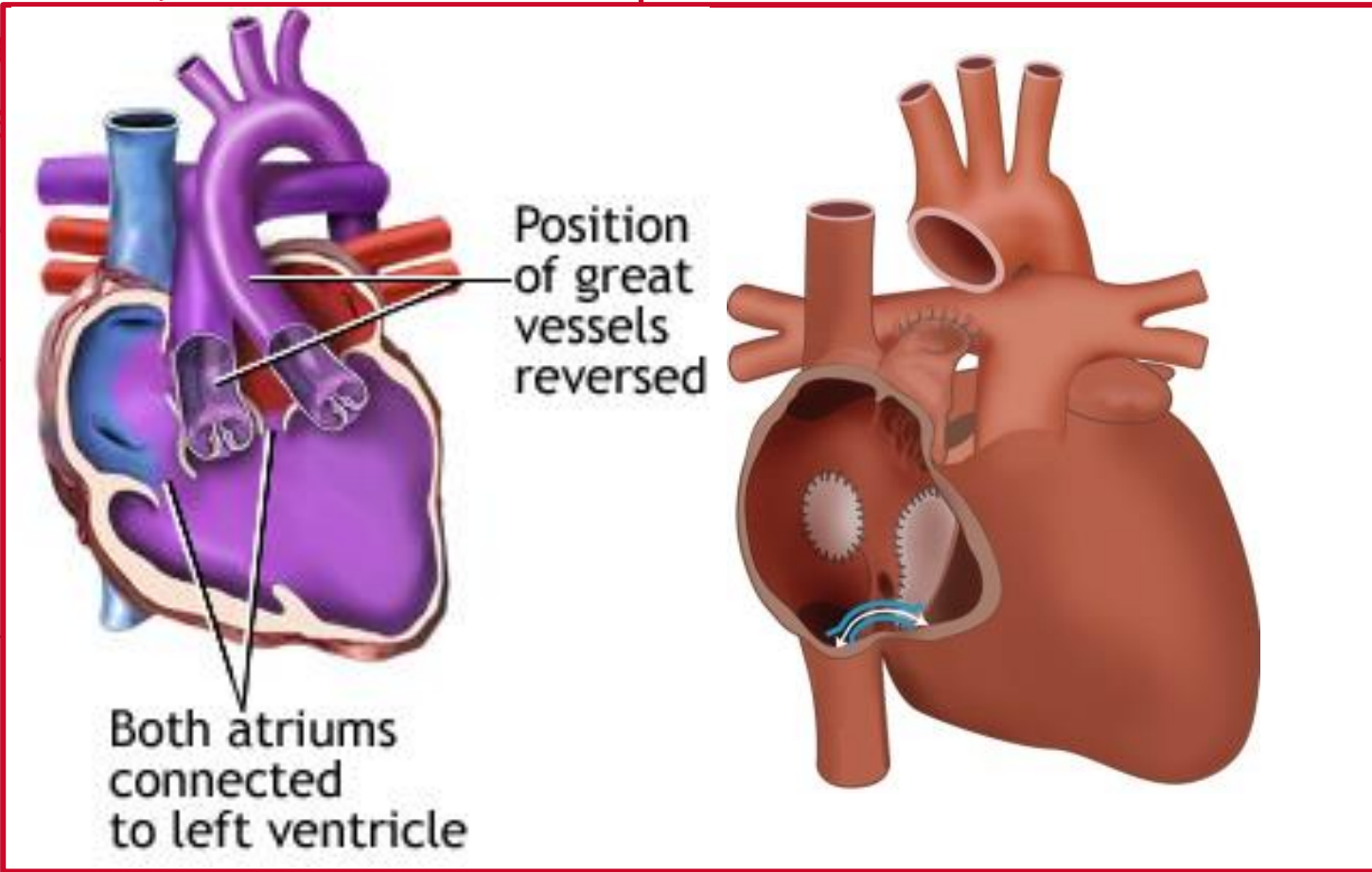


Casus 4 | ♂ | 25 jaar

Double inlet LV, klassieke Fontan operatie

Presenta
Cardiove

Geïnducee



Casus 4 | ♂ | 25 jaar

Double inlet LV, klassieke Fontan operatie met pulmonalishomograaf

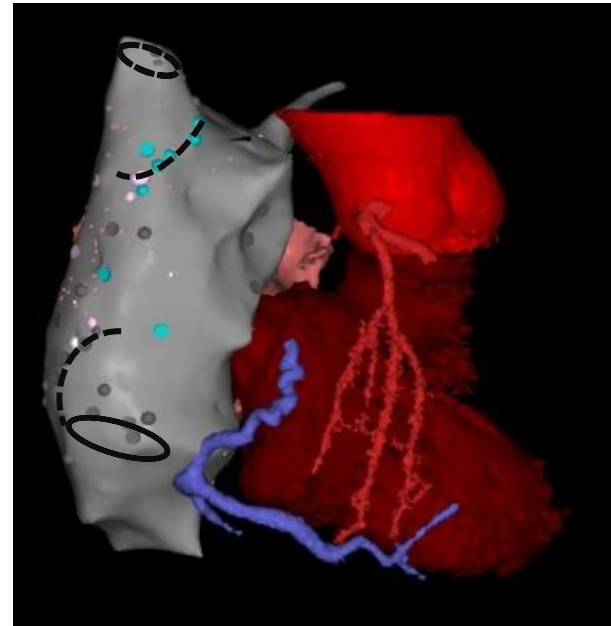
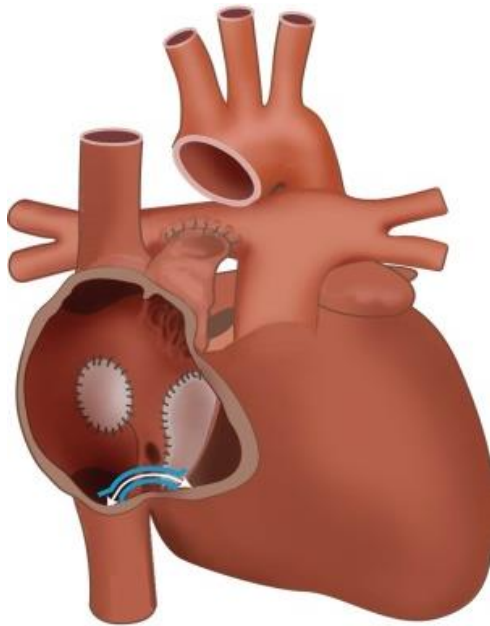
Complexe anatomie: image integratie nodig!



Casus 4 | ♂ | 25 jaar

Double inlet LV, klassieke Fontan operatie met pulmonalishomograaf

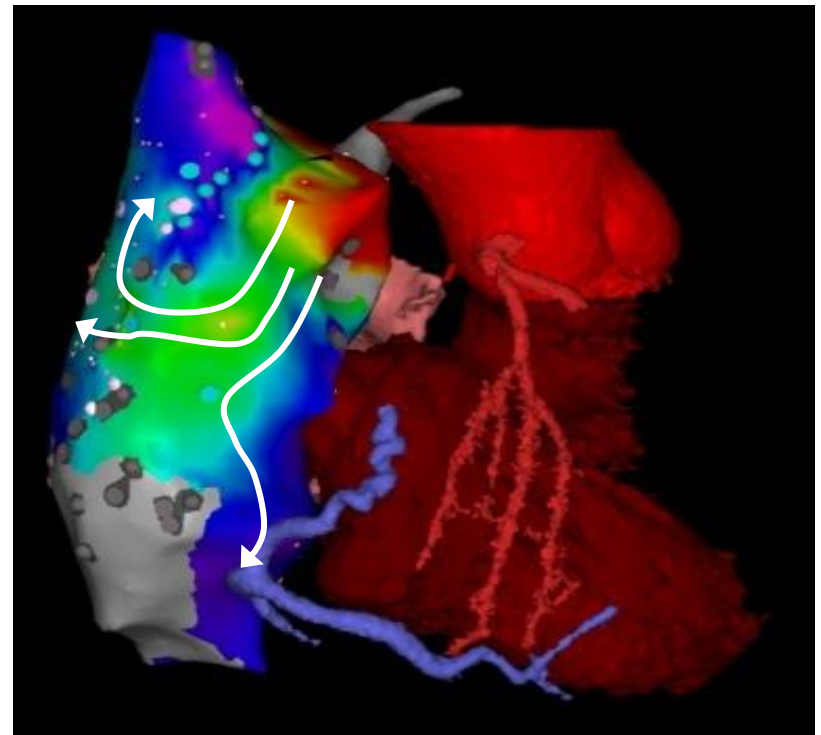
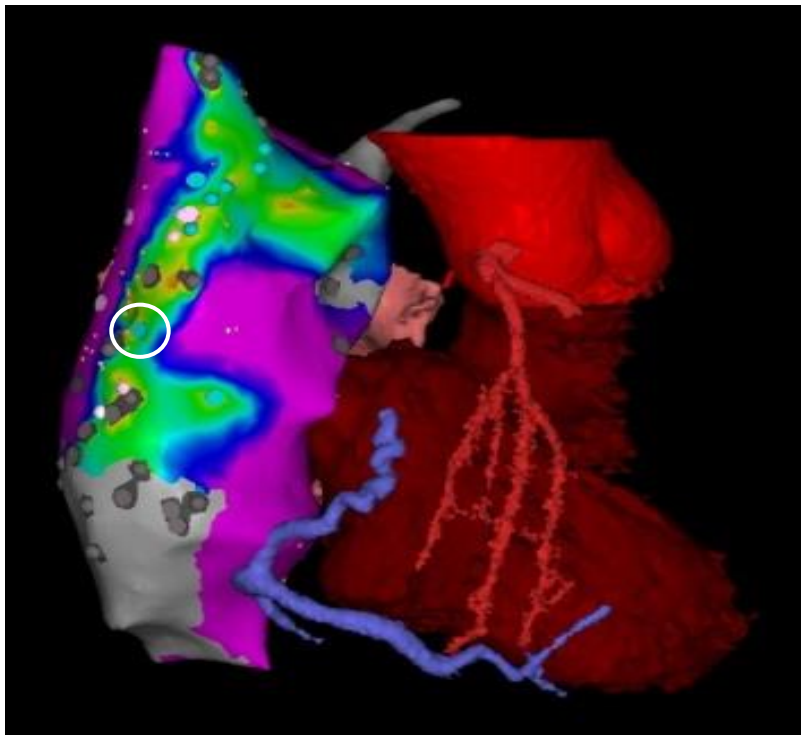
Electroanatomische map met image integratie: uittekenen van complexe anatomie



Casus 4 | ♂ | 25 jaar

Double inlet LV, klassieke Fontan operatie met pulmonalishomograaft

Electroanatomische map met image integratie: substraat identificatie

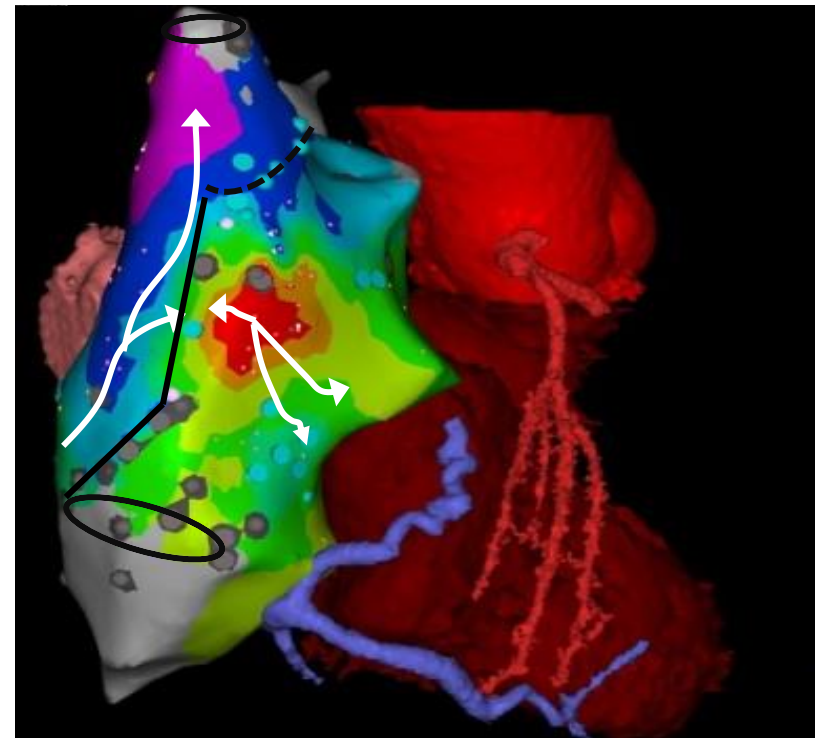
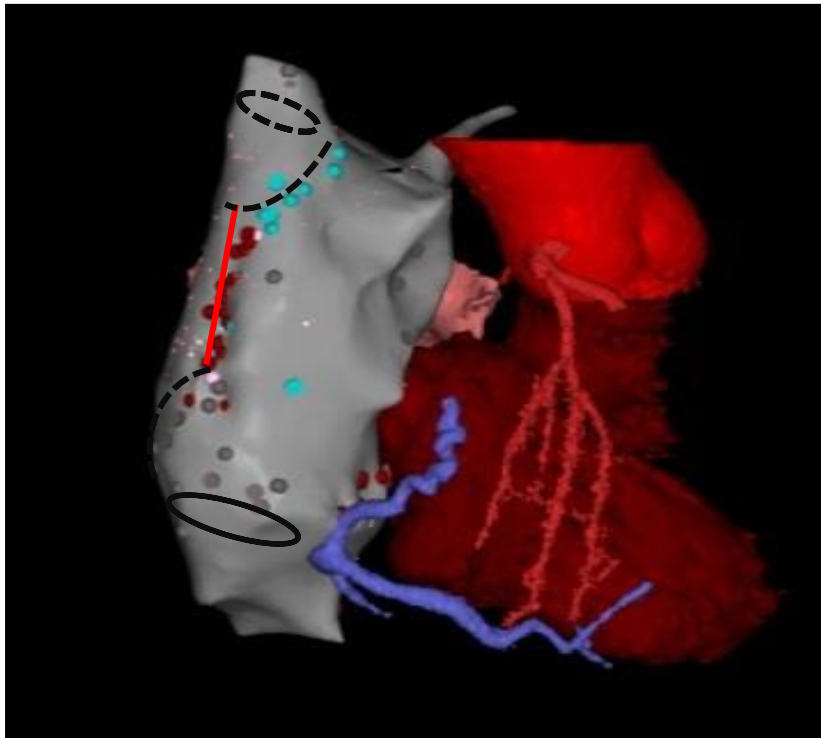


Casus 4 | ♂ | 25 jaar

Double inlet LV, klassieke Fontan operatie met pulmonalishomograaf

Electroanatomische map met image integratie:

Verbinden van anatomische grenzen en verifiëren van geleidingsblok





HART LONG
CENTRUM LEIDEN

Conclusie

Boezemflutter na een hartoperatie op jonge leeftijd

- Hoge incidentie bij aangeboren hartafwijkingen
- Termineren en evalueren als ventriculaire aritmie
- Evaluatie van hemodynamiek en residuele laesies
- Verwijs naar elektrofysiologisch centrum met ervaring voor invasieve behandeling

Boezemflutter na een hartoperatie op jonge leeftijd

- Ablatiebehandeling uitdagend
 - Variabele anatomie
 - Uitgebreid en complex substraat
 - Problemen met catheter-toegang
 - Moeizame laesievorming door variabele wanddikte
- Succespercentages ablatiebehandeling verbeteren
 - Betere techniek
 - Image integratie
 - Ervaren operateurs



HART LONG
CENTRUM LEIDEN

Bedankt voor uw aandacht!



HART LONG
CENTRUM LEIDEN

?