

INTRA CARDIAC SHUNT EVALUATION USING ADVANCED CARDIAC IMAGING

VRINDA SARDANA MD

NO DISCLOSURES AT THIS TIME

GOALS OF EVALUATION

- Determine threshold for intervention, $Q_p/Q_s > 1.5$
- Assess suitability for intervention
- Guidance of intervention-sizing/morphology
- Checking for associated anomalies that may need attention

ECHO

- Grssdu#hkrfdglrjusk|#dq#xdqwi|#bwr0ijk#kxqwj#e|#s2T v#urp #Grssdu0ghuyhg#sxø rqlf#
dgg#drwf#earg#orz v
- Qrq0bydvih/#rqd#d#rxjk#hwp dnr#kxqwp djqlwgh#
- Dghtxdw#dfrxwf#z bgrz v#fdqqrweh#rewbhg#q#ds dwhqw#
- vp dchurw#q#k#p hdvxhp hqwr #g bp hwn#OYR W#JYR W #qwrqxfh#dujh#hurw#qr#orz #dofxdlrqv1

CATH

- Wkh# { p hwl#lvhvvp hq#r#r { | jhq#r qwhq#w#ru#dwudw#r qv#b#kh#y d#r xv#ij kw#v gh# khdw#kdp ehw#v#hf rughg#dqg#d#z v#r qh#r#g hwp gh#erw#kxqw#rfdw#r q#dqg# p djqlxgh#
- Iydvlyh
- Iqvhqvllyh#rughwfwlj#vp d#kxqw#
- Hw#p dw#r#kxqw#p djqlxgh#p d|eh#vrp hz kdw#p shflvh#b#s dwhq#w#z w#olujh#kxqw#1

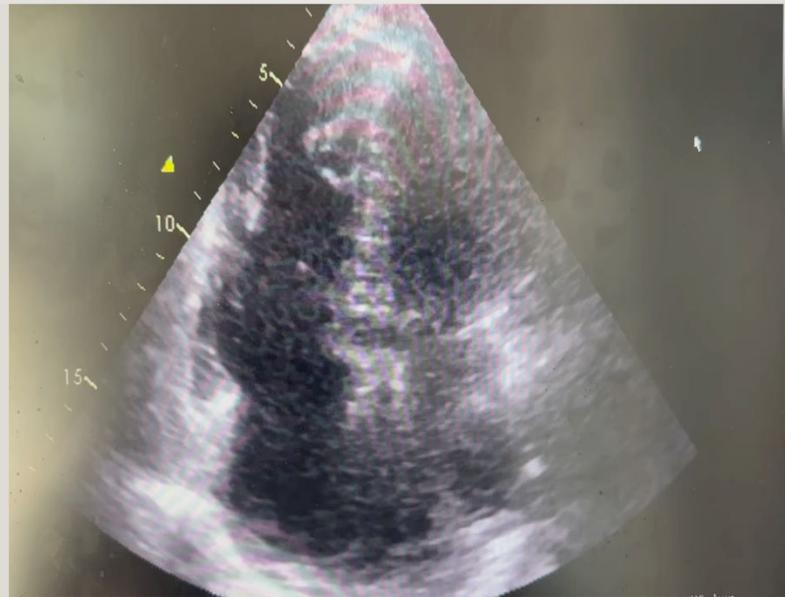
ROLE OF ACI (ADVANCED CARDIAC IMAGING)

- Uds g /#dffxudh/#grqbydvlyh/#dgg#z ghq#dssdfdeh#p hkrq#r#hvw# dwj#kh#
p djqlxgh#r#qwdfdugbf#biw#uljkw#kxqwbj#v#ghvlded1
- F dugbf#P U#dgg#F dugbf#F WD

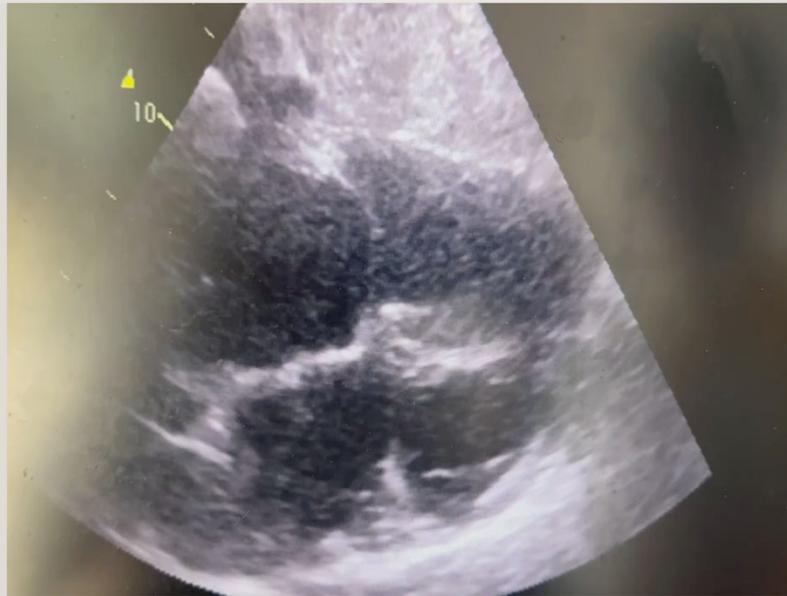
CASE #1

- 50 year old Caucasian female referred for heart murmur, fatigue and exertional dyspnea
- History : hypertension, dyslipidemia
- Exam: soft systolic murmur
- Echo

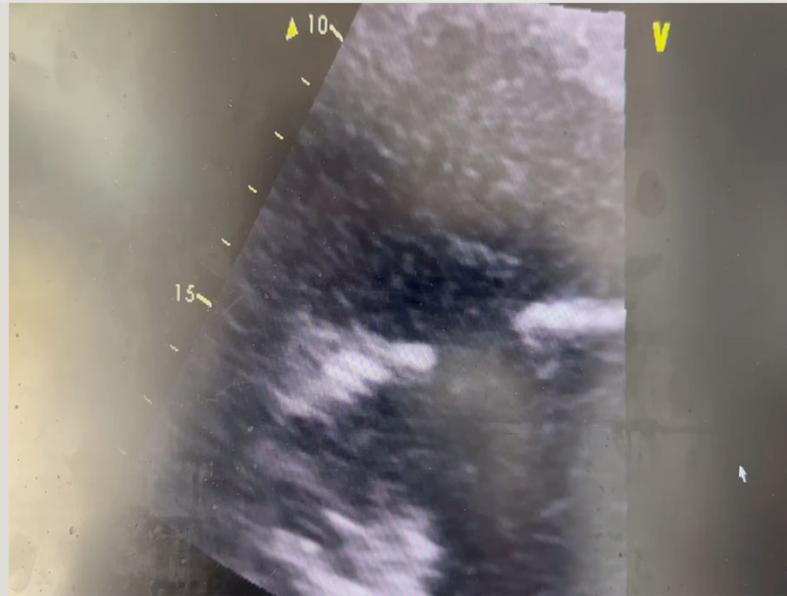
TTE :RV DILATION



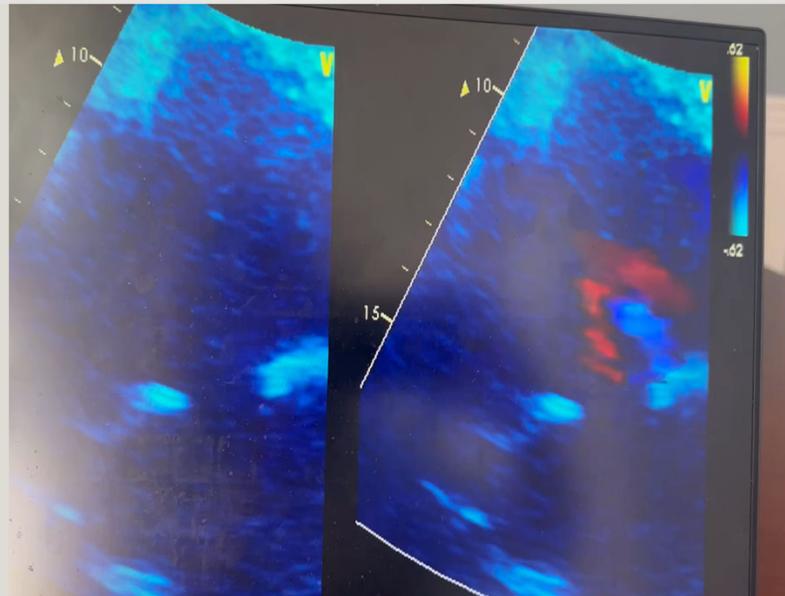
TTE SUGGESTING A SECUNDUM ASD



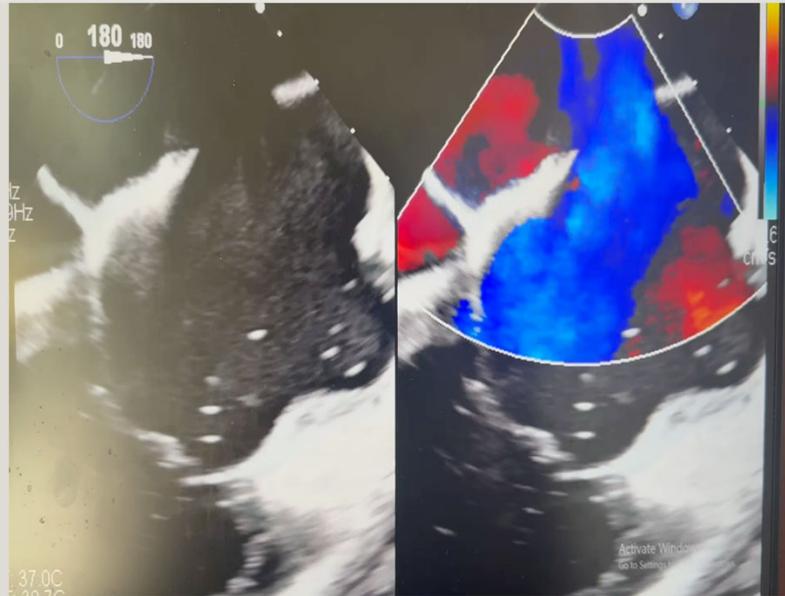
ASD ON ECHO

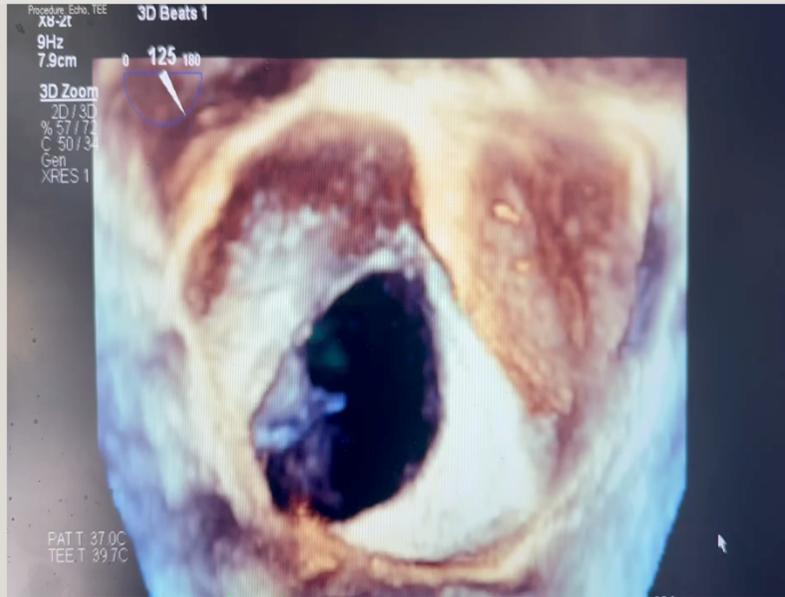


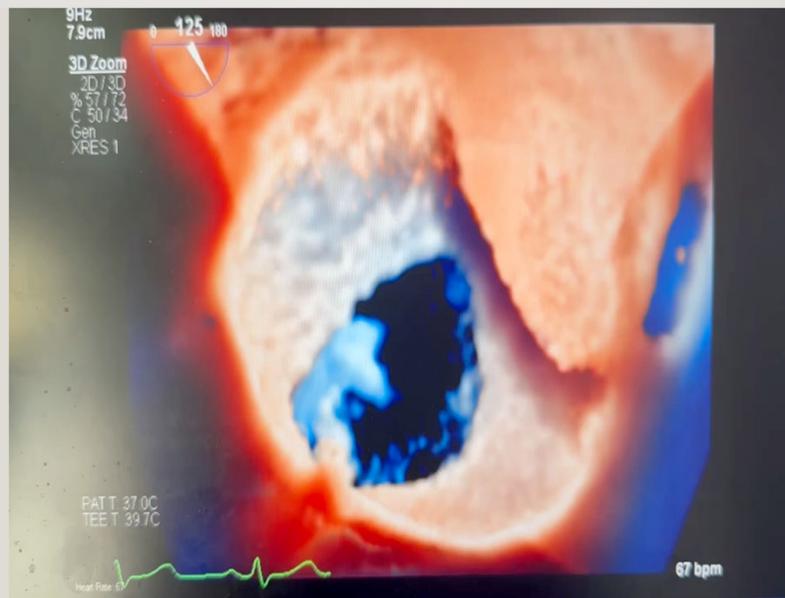
ASD: COLOR



TEE : SIZING OF THE ASD FOR CLOSURE







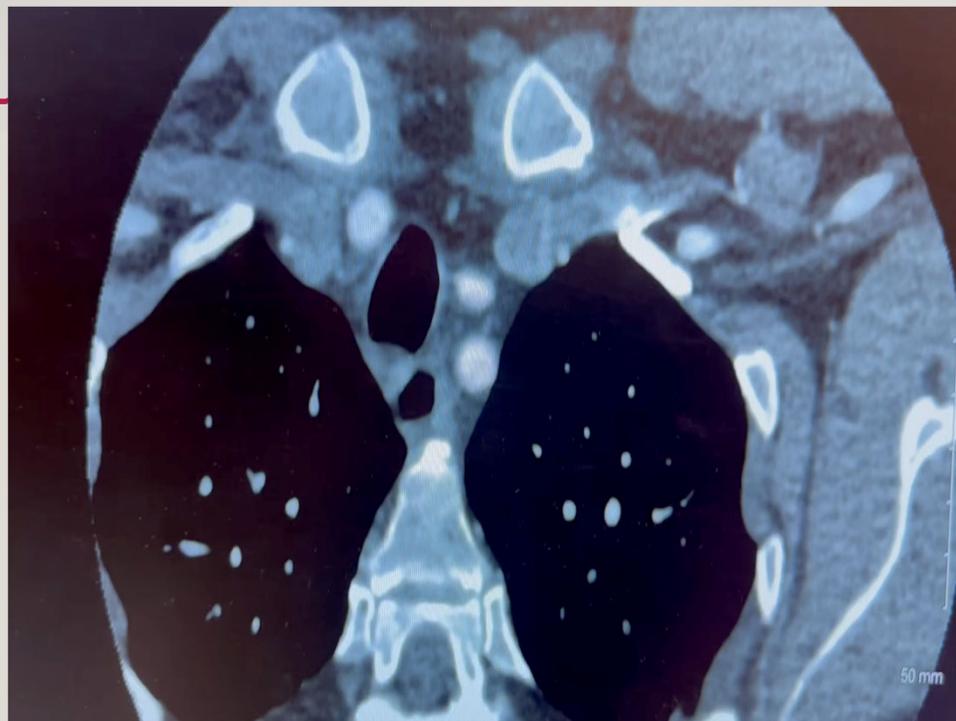
TEE QUANTIFIED WELL

- Q_p/Q_s 1.9
- Dilated RV
- Preserved EF , mild MR

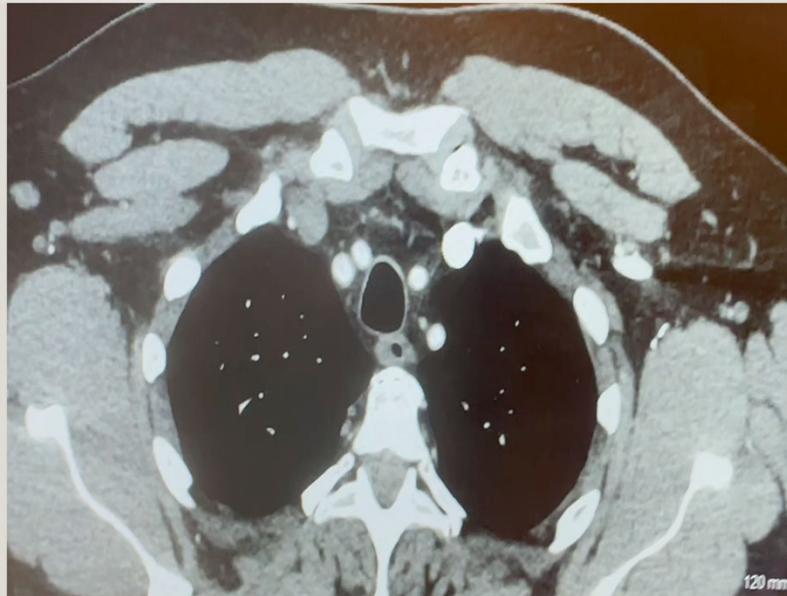
ROLE OF ADVANCED IMAGING HERE

- Shunt quantification done with TEE, Q_p/Q_s 1.9
- Sizing of ASD apt for percutaneous closure
- Associated anomalies ??

CARDIAC CT



UNFORTUNATE CASE: MISSED PAPVR



CASE #2

- 66 yr old lady with exertional shortness of breath and edema
- Systolic murmur, bp normal
- sleep study, PFTs done in the past –unremarkable
- Referred to us

TEE

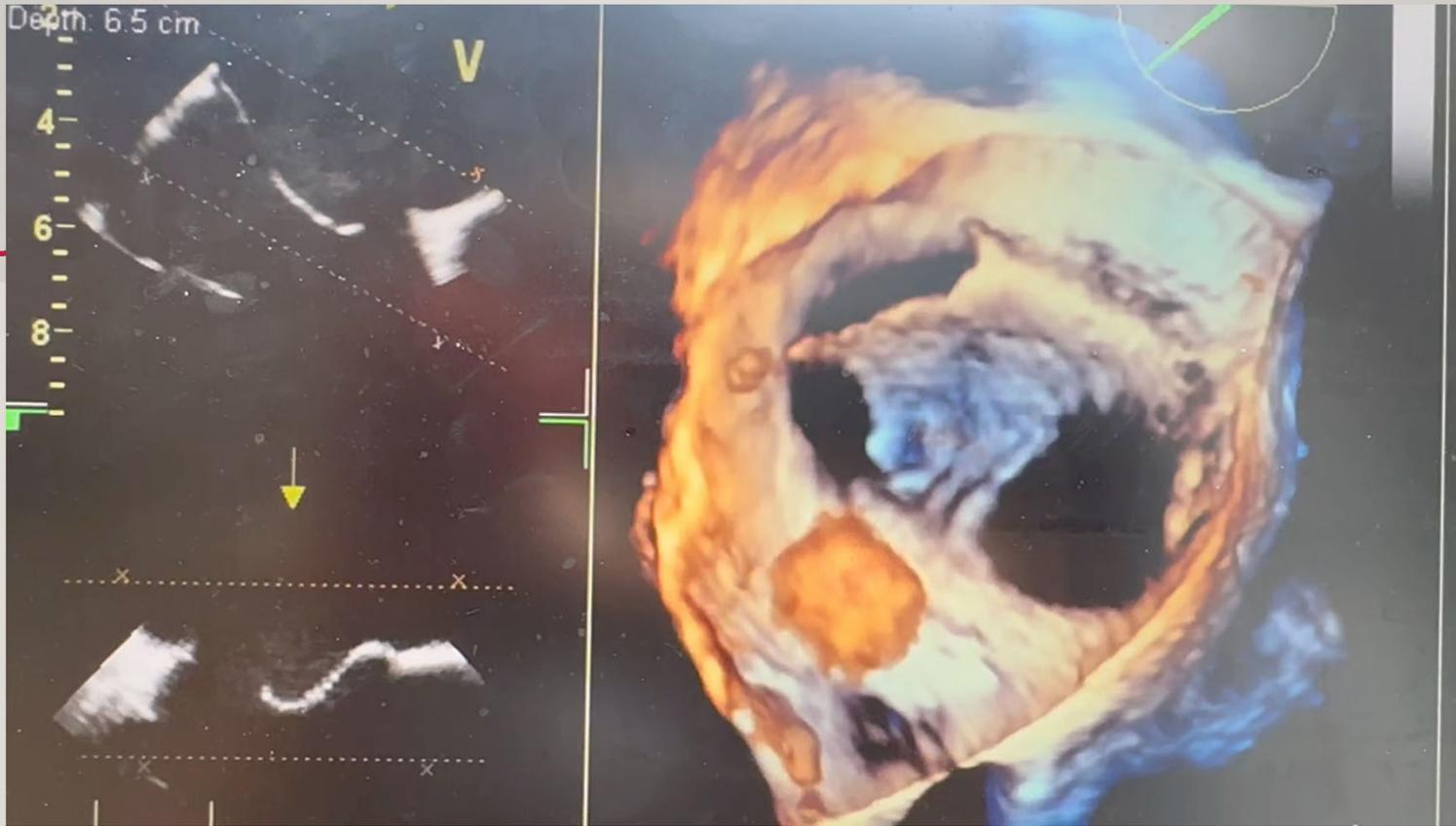


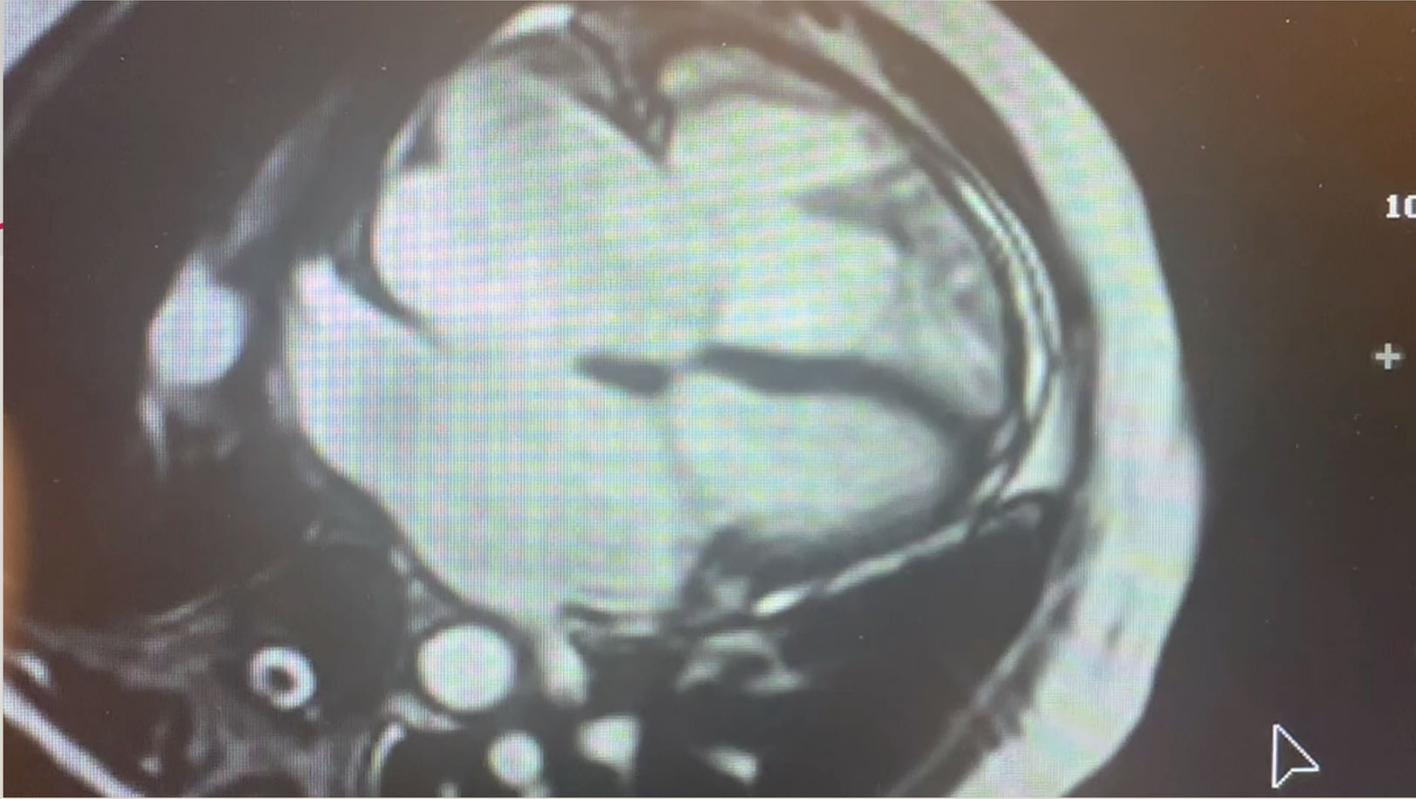
TEE: BETTER VISUALIZATION OF THE ASD

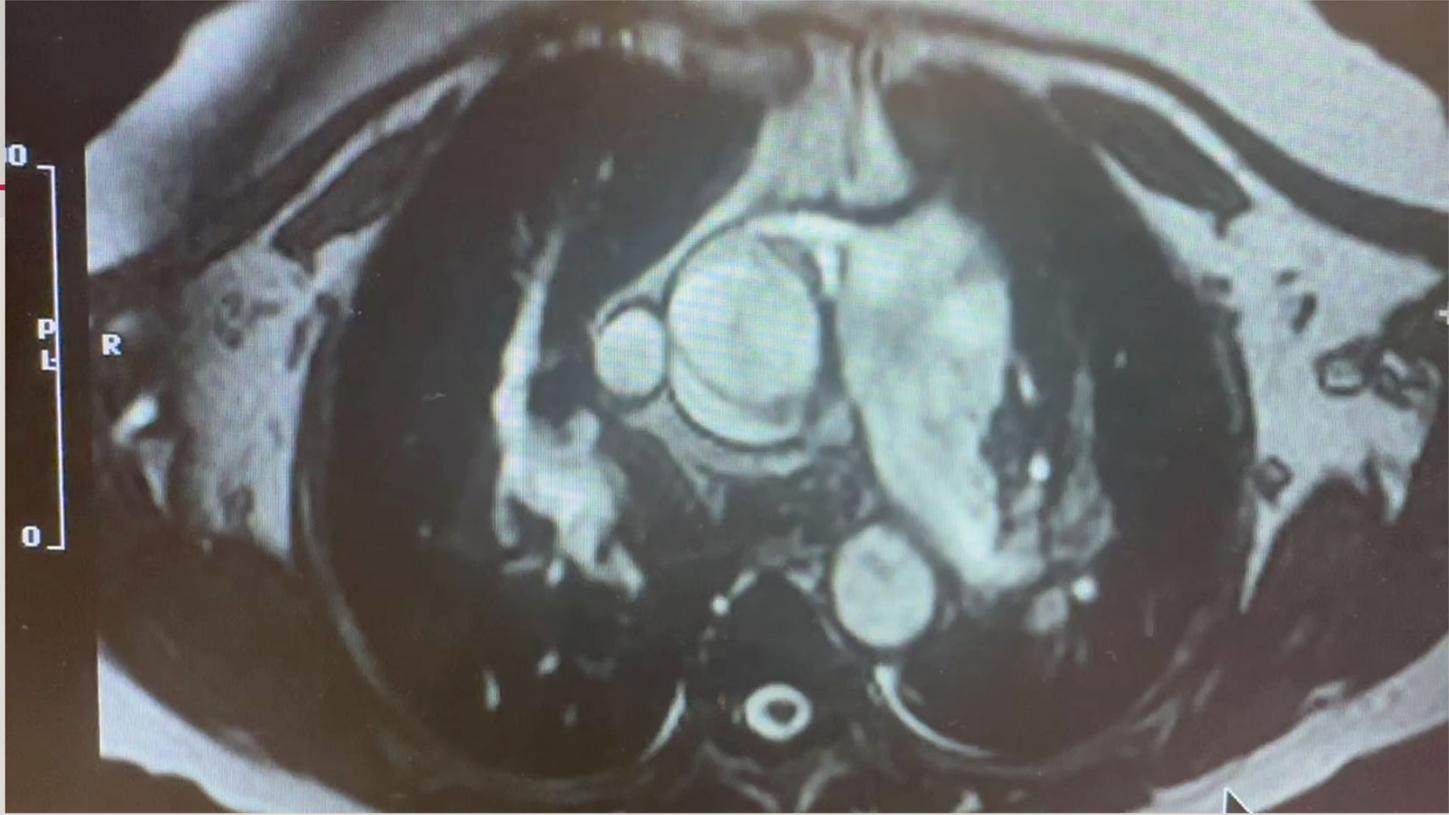


23.3
h: 14.0 cm









CARDIAC MRI

- Q_p Q_s 2.8
- RVEDVI 135 ml/m²
- RVEF 35%

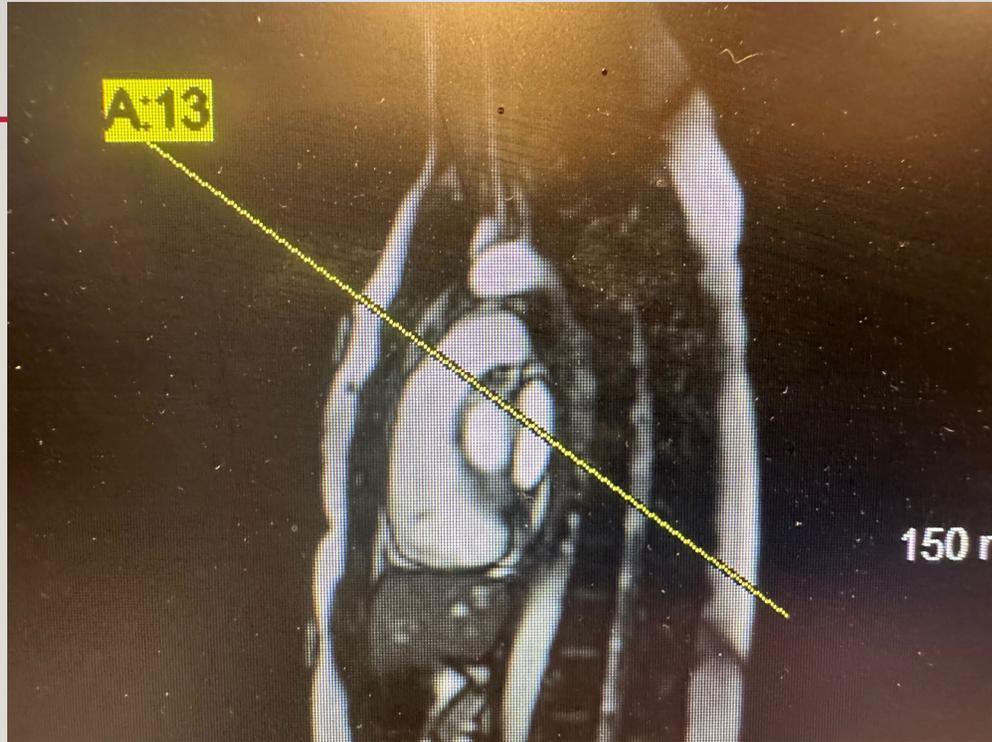
- Referred to surgery given several ASD

CMR: FLOW PHYSICS

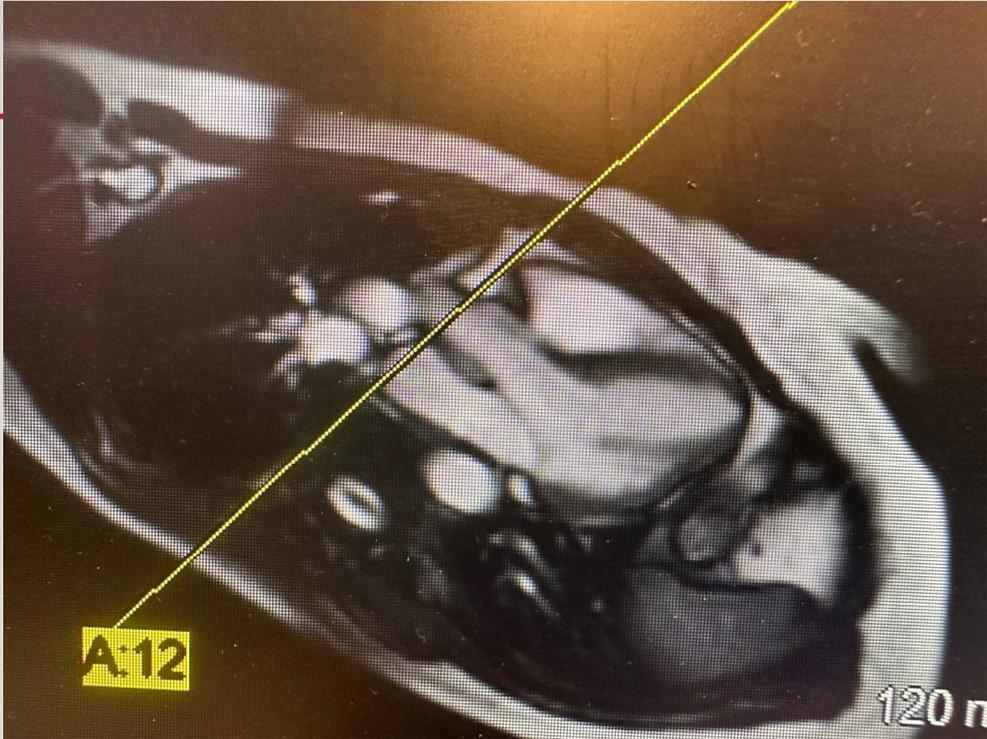
- SkdvhG llnhgfh# hwkrgv#duh#edvng#r#kh#subf#s#kdwk | gurjhq#p#x#f#o#p rybj #k#ur#x#j#k#d#p dj qhw#E# ihg#j#udg#hqw#d#f#x#p x#o#h#d#s#k#d#v#h#k#l#w#s#u#r#r#w#r#q#d#r#k#h#l#y#h#o#f#w|#
- I#r#z#E# #v#E#d#d#x#o#w#g#e|#p#x#o#s#q#l#j#e#o#r#g#y#h#o#f#w|#Y#e|#k#h#E#u#r#w#v#h#f#w#r#q#d#d#h#d##D#r#k#h#y#d#v#f#x#o#u# w#x#f#w#h#r#k#y#h#u#h#w#E#E#@Y#E#D
- Z k#k#l#h#n#f#k#q#l#x#h/#o#z#E#d#q#e#h#p#h#d#v#x#h#g#t#x#f#n#q#*
- V#f#d#q#v#E#d#q#e#h#s#h#u#i#r#p#h#g#q#d#v#v#k#d#q#E#p#l#x#h#v



QP



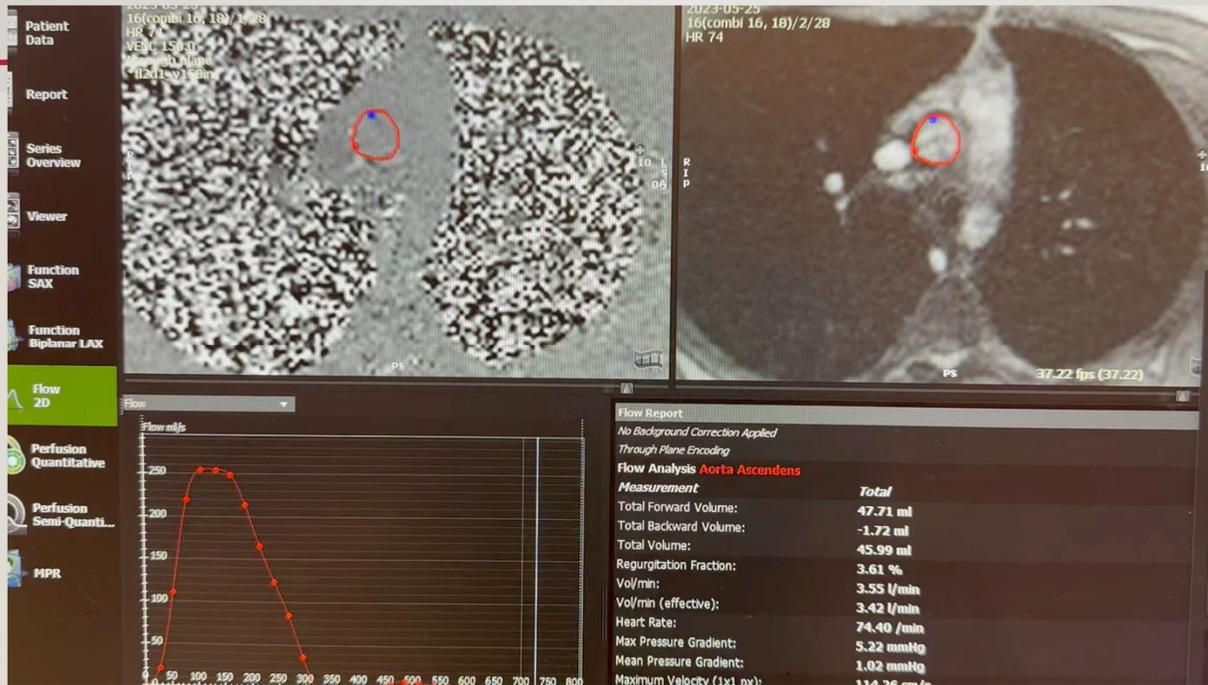
QS



PHASE CONTRAST: COMPLEX FLOW ANALYSIS



FLOW



CMR ADVANTAGES

- vdih/#hdvrqded#frp irudeh/#prqbydvlyh/#dgg#hdvq#shuirp hg#q#dq#rxsdwhq#
vhwbj#z lkrxw#kh#qhhg#ru#rq#}bj#dg bwrq#ru#qwdydvfxolu#qmfwlrqv#
- vlbjd#or z #p hdvxhp hqw#du#shuirp hg#ds gq#q#bv#kdq#6 #p bxwv,#dor z bj#d#
frp swh#khp rg|qdp l#dvvhvp hqw#q#bv#kdq#1 3 #p bxwv#
- h{fhdqwy#ixdd}dwrq#r#kh#dhd#dgg#horflw#surib#/#p shg p hqw#shvhqwhg#e|#
erg|#kdsh#dgg#v}h#du#r#dwb#frqfhuq#

Circulation. 1995;91:2955–2960

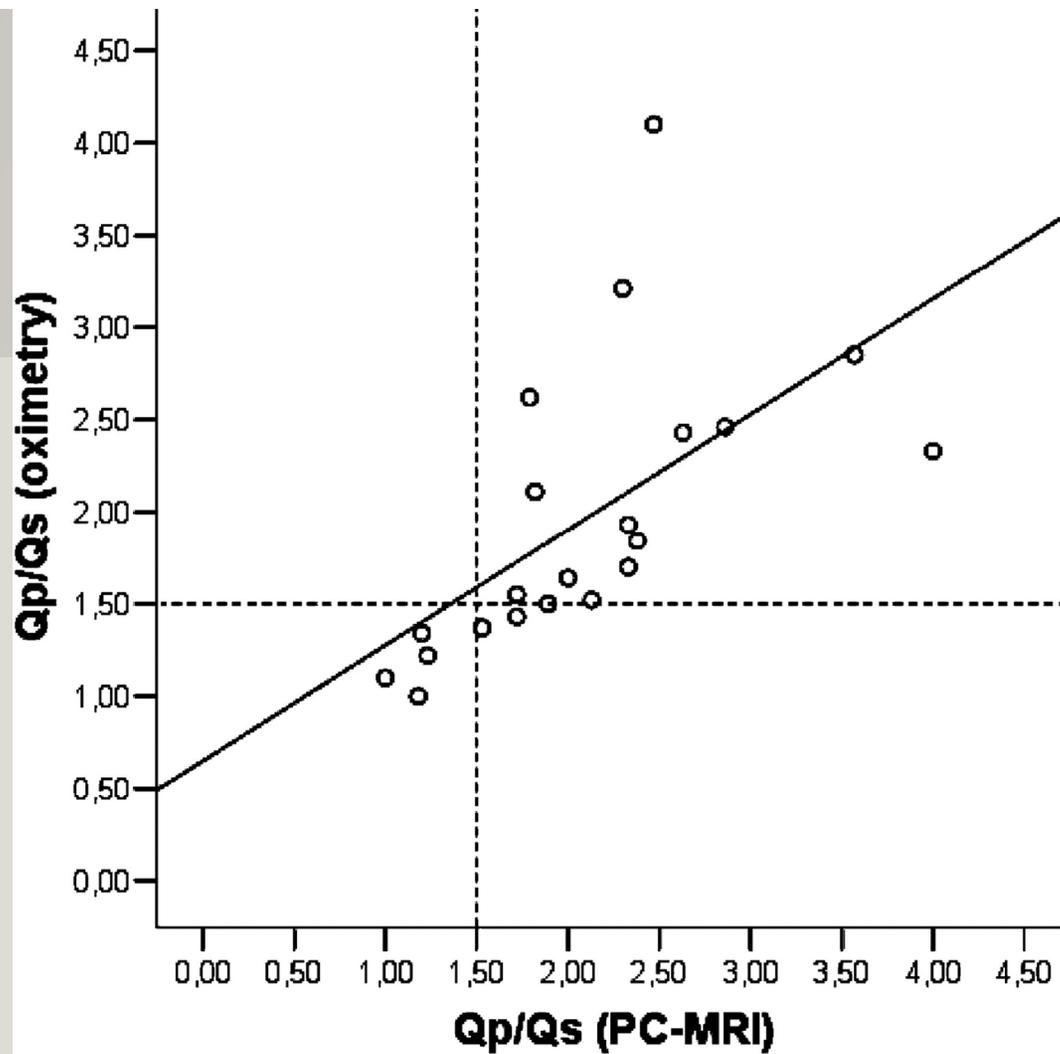


CMR ADVANTAGES

- Dvvrflbwg#dgrp dchv/#vxfk#dv#dgrp dæxv#sxø rqud|#hqrqv#gudbdjh#
ru#sdwqwgxfwv#dwhulrvxv
- ylxdd}h#bwdfdugbf#wxfwuhv#ehiru#dgg#dihu#xuj lfd#bwhuyhqwrq
- Uhfrqvwxfw#kuhg p hqv lrqde#p djhv#r#kh#khdw#dgg#j undw#hvvho#q#
sdw hqw#z krvh#dqdrp |#v#frp sØ{1

CMR VALIDATED AGAINST CATH OXIMETRY

- Noninvasive quantification of left-to-right shunt in pediatric patients: phase-contrast cine magnetic resonance imaging compared with invasive oximetry. Beerbaum P, Körperich H, Barth P, Esdorn H, Gieseke J, Meyer H. *Circulation*. 2001 May 22;103(20):2476-82. doi: 10.1161/01.cir.103.20.2476.
- Determination of Qp/Qs by PC-MRI in children is quick, safe, and reliable compared with oximetry.

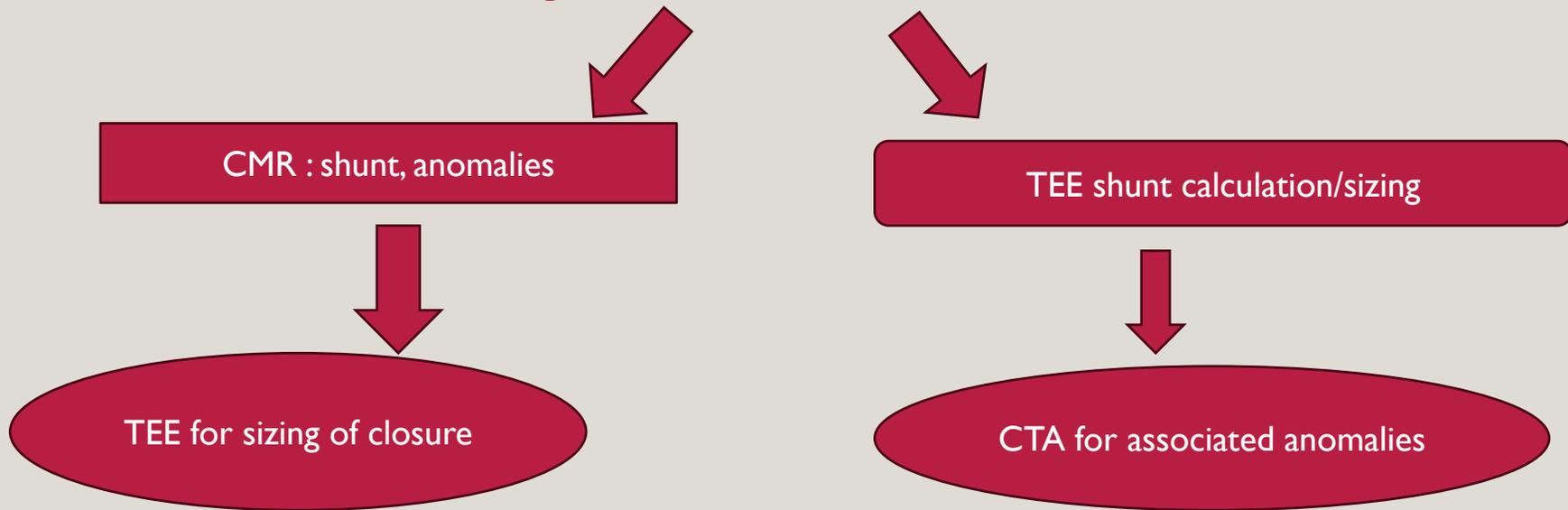


<https://doi.org/10.1259/bjr/18500608>

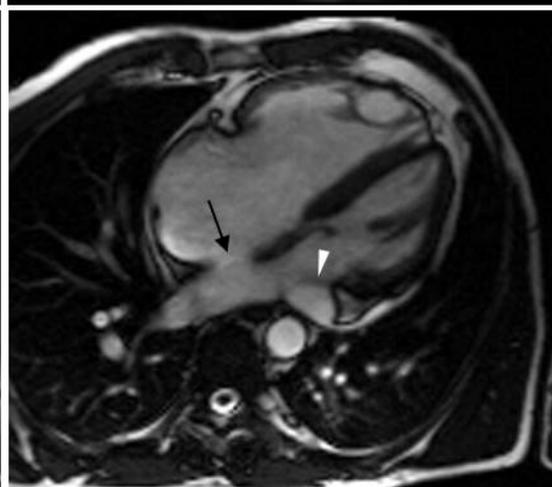
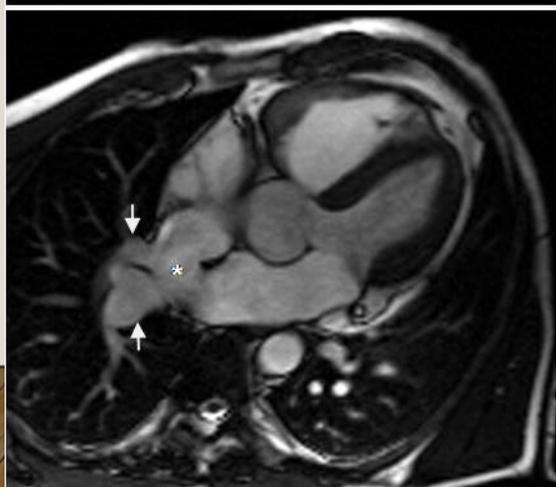
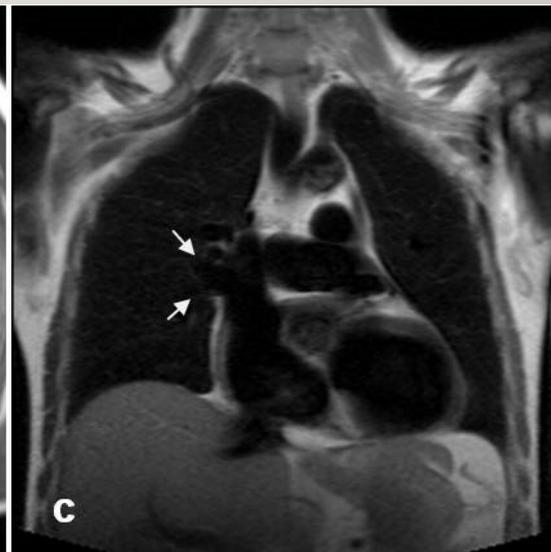
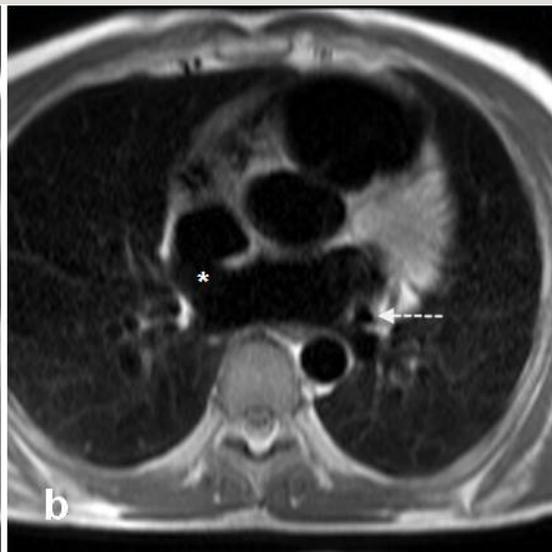
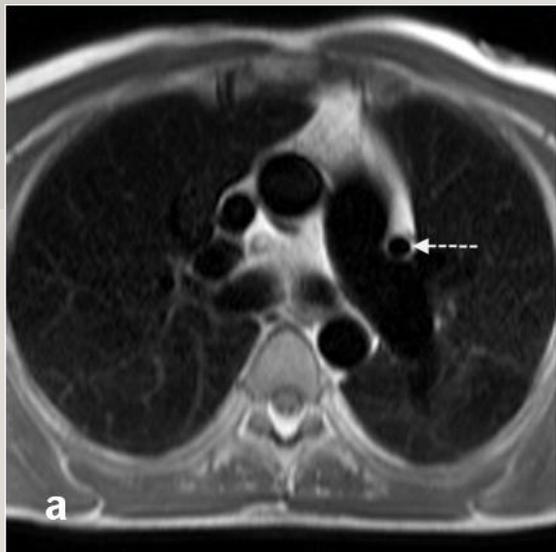
2014 study
ASD/VSD/PDA patients
Validating CMR Qp/Qs to Cath Oximetry

INTRA CARDIAC SHUNT: DIAGNOSTIC TRACK

Dilated right sided cardiac chambers on Echo



CARDIAC MRI: STILL REMAINS ONE STOP SHOP



QUESTIONS ???

- Thank you