

Safety Normal Values

From CMR Pocket Guide First Edition 2013

Safety

Common Devices

MR unsafe

- Any device which is known to threaten or pose hazard in all MR environments
- Most pacemakers
- Insulin pumps
- Most implantable cardioverter / defibrillators
- Metal foreign bodies in the eye



MR conditional

- Any device which is demonstrated to pose **NO** hazard in a **specific** MR environment with **specified** conditions
- Most metallic heart valves
- Intra-coronary stents
- Prosthetic joints
- Dentures



MR safe

- Any device which is known to pose **NO** hazard in **all** MR environments
- Only assume that a device is MR safe if it has this logo on it



Tips & Tricks

Any doubt? Check online: www.mrisafety.com

Safety

Nephrogenic Systemic Fibrosis

General

- Thought to be related to toxic effects of Gd ions in patients with advanced renal failure / haemodialysis
- Causes fibrosis of skin, joints, eyes, and internal organs
- Very rare, but serious syndrome

Contrast media and safety

Safest (cyclical structure):

- Dotarem, Gadovist, ProHance

Intermediate safety (ionic linear structure):

- Magnevist, MultiHance, Primovist, Vasovist

Lowest safety (linear non-ionic structure):

- Omniscan, OptiMARK

Note: No cases of NSF have been reported in patients with normal renal function

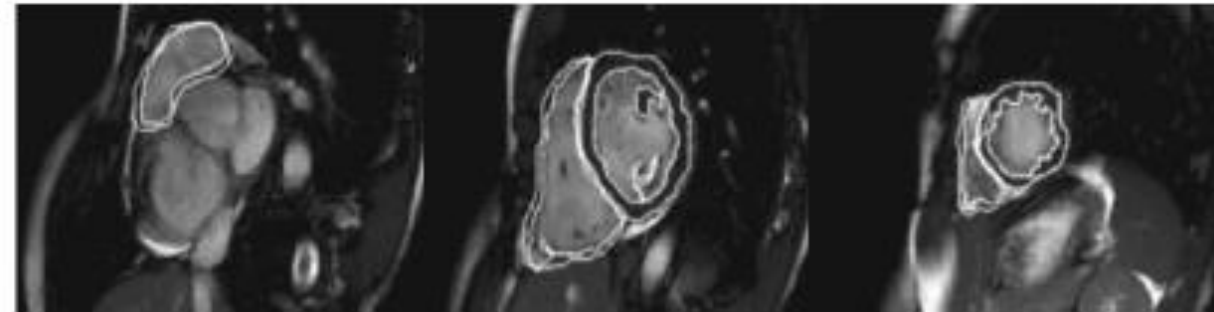
Tips & Tricks

- **eGFR 30-60ml/min/1.73m²:** choose safest contrast agent, use only with caution
- **eGFR <30ml/min/1.73m²:** linear structured contrast agents contraindicated
- **In patients with severe renal failure:** consider haemodialysis within 2 hours after contrast agent administration – not proven to prevent NSF

LV Volumes, Function and Mass Male Adults

Absolute Values	<35 years	≥35 years
EDV (ml)	173 ± 29 (115–231)	149 ± 25 (99–199)
ESV (ml)	7 ± 15 (27–87)	43 ± 13 (17–69)
SV (ml)	118 ± 18 (82–154)	106 ± 19 (68–144)
EF (%)	67 ± 5 (57–77)	71 ± 6 (59–83)
Mass (g)	131 ± 21 (89–173)	120 ± 23 (74–166)

Indexed to BSA	<35 years	≥35 years
EDV/BSA (ml/m ²)	90 ± 11 (68–112)	75 ± 11 (53–97)
ESV/BSA (ml/m ²)	30 ± 7 (16–44)	22 ± 6 (10–34)
SV/BSA (ml/m ²)	60 ± 8 (44–76)	53 ± 8 (37–69)
Mass/BSA (g/m ²)	67 ± 10 (47–87)	60 ± 9 (42–78)

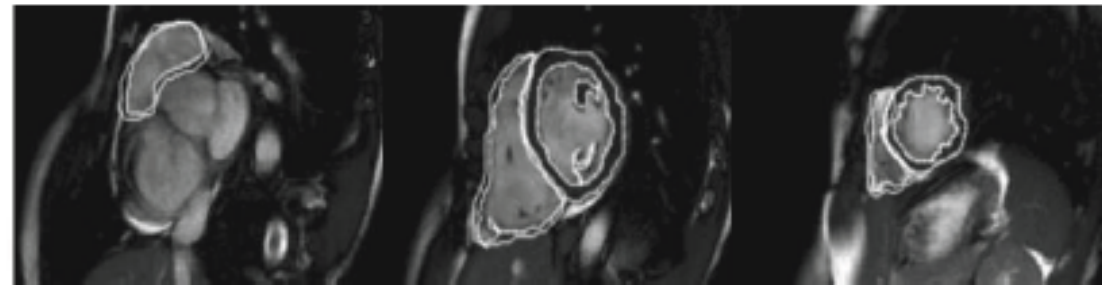


Reference 2). Values are given as mean ± SD; reference ranges in brackets, calculated as ± 2SD of the mean. Analysed with Argus software from short axis SSFP cine images. These values may vary depending on image sequence, acquisition technique and contouring.

LV Volumes, Function and Mass Female Adults

Absolute Values	<35 years	≥35 years
EDV (ml)	137 ± 25 (87–187)	128 ± 23 (82–174)
ESV (ml)	43 ± 11 (21–65)	40 ± 12 (16–64)
SV (ml)	96 ± 18 (60–132)	89 ± 16 (57–121)
EF (%)	69 ± 6 (57–81)	69 ± 6 (57–81)
Mass (g)	92 ± 20 (52–132)	92 ± 19 (54–130)

Indexed to BSA	<35 years	≥35 years
EDV/BSA (ml/m ²)	80 ± 9 (62–98)	73 ± 11 (51–95)
ESV/BSA (ml/m ²)	25 ± 6 (13–37)	23 ± 6 (11–35)
SV/BSA (ml/m ²)	55 ± 6 (43–67)	51 ± 8 (35–67)
Mass/BSA (g/m ²)	53 ± 9 (35–71)	52 ± 9 (34–70)

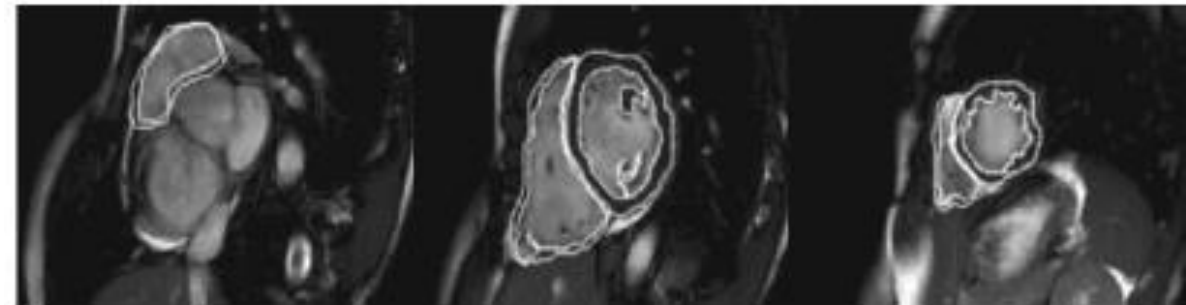


Reference 2). Values are given as mean ± SD; reference ranges in brackets, calculated as ± 2SD of the mean. Analysed with Argus software from short axis SSFP cine images. These values may vary depending on image sequence, acquisition technique and contouring.

RV Volumes, Function and Mass Male Adults

Absolute Values	<35 years	≥35 years
EDV (ml)	203 ± 33 (137–269)	181 ± 28 (125–237)
ESV (ml)	87 ± 20 (47–127)	71 ± 17 (37–105)
SV (ml)	116 ± 19 (78–154)	110 ± 18 (74–146)
EF (%)	57 ± 5 (47–67)	61 ± 6 (49–73)
Mass (g)	42 ± 8 (26–58)	39 ± 7 (25–53)

Indexed to BSA	<35 years	≥35 years
EDV/BSA (ml/m ²)	104 ± 15 (74–134)	89 ± 11 (67–111)
ESV/BSA (ml/m ²)	44 ± 9 (26–62)	34 ± 7 (20–48)
SV/BSA (ml/m ²)	59 ± 9 (41–77)	55 ± 8 (39–71)
Mass/BSA (g/m ²)	22 ± 4 (14–30)	20 ± 3 (14–26)



Reference 2). Values are given as mean ± SD; reference ranges in brackets, calculated as ± 2SD of the mean. Analysed with Argus software from short axis SSFP cine images. These values may vary depending on image sequence, acquisition technique and contouring.

RV Volumes, Function and Mass Female Adults

Absolute Values	<35 years	≥35 years
EDV (ml)	152 ± 27 (98–206)	140 ± 37 (66–214)
ESV (ml)	59 ± 12 (35–83)	52 ± 22 (8–96)
SV (ml)	93 ± 17 (59–127)	93 ± 17 (50–126)
EF (%)	61 ± 3 (55–67)	64 ± 7 (50–78)
Mass (g)	36 ± 7 (22–50)	33 ± 7 (19–47)

Indexed to BSA	<35 years	≥35 years
EDV/BSA (ml/m ²)	89 ± 11 (67–111)	80 ± 19 (42–118)
ESV/BSA (ml/m ²)	35 ± 5 (25–45)	30 ± 12 (6–54)
SV/BSA (ml/m ²)	54 ± 7 (40–68)	54 ± 7 (32–68)
Mass/BSA (g/m ²)	21 ± 3 (15–27)	19 ± 3 (13–25)



Reference 2). Values are given as mean ± SD; reference ranges in brackets, calculated as ± 2SD of the mean. Analysed with Argus software from short axis SSFP cine images. These values may vary depending on image sequence, acquisition technique and contouring.

Aortic Root Dimensions

Male

	20-29 years	30-39 years	40-49 years
Annulus (s)	21.4 ± 2.4	20.7 ± 1.7	21.6 ± 2.0
Annulus (c)	26.5 ± 1.8	25.2 ± 2.4	25.8 ± 1.5
Aortic sinus (s)	30.5 ± 3.9	29.8 ± 3.8	32.0 ± 2.4
Aortic sinus (c)	32.5 ± 3.4	31.8 ± 4.8	33.6 ± 2.6
Sinotubular junction (s)	23.3 ± 3.4	22.2 ± 4.0	24.4 ± 3.3
Sinotubular junction (c)	23.7 ± 3.5	22.2 ± 3.0	24.5 ± 2.4
	50-59 years	60-69 years	70-79 years
Annulus (s)	22.8 ± 2.8	23.5 ± 1.8	23.3 ± 2.7
Annulus (c)	26.4 ± 3.7	26.5 ± 1.8	26.6 ± 1.9
Aortic sinus (s)	33.3 ± 6.1	33.6 ± 2.7	35.1 ± 3.7
Aortic sinus (c)	34.7 ± 6.4	35.7 ± 3.3	36.1 ± 3.5
Sinotubular junction (s)	26.6 ± 3.1	27.6 ± 3.6	28.3 ± 2.7
Sinotubular junction (c)	26.5 ± 3.7	27.5 ± 2.4	27.8 ± 1.7



Reference 3). Data measured in diastole and presented as mean ± SD in mm. Analyzed from sagittal (s) and coronal (c) SSFP LVOT cines

Aortic Root Dimensions Female

	20-29 years	30-39 years	40-49 years
Annulus (s)	19.5 ± 2.4	19.2 ± 2.3	19.9 ± 2.2
Annulus (c)	23.6 ± 3.0	22.9 ± 2.3	23.3 ± 1.5
Aortic sinus (s)	26.5 ± 4.0	26.9 ± 3.1	31.5 ± 2.8
Aortic sinus (c)	28.5 ± 4.9	28.2 ± 3.1	32.0 ± 2.5
Sinotubular junction (s)	21.1 ± 3.3	21.8 ± 2.8	25.7 ± 2.3
Sinotubular junction (c)	21.5 ± 2.7	22.1 ± 2.7	25.5 ± 2.1
	50-59 years	60-69 years	70-79 years
Annulus (s)	20.1 ± 1.9	20.4 ± 1.1	20.2 ± 1.5
Annulus (c)	22.7 ± 2.1	22.3 ± 1.5	23.3 ± 1.5
Aortic sinus (s)	29.1 ± 2.5	30.1 ± 2.5	30.2 ± 2.0
Aortic sinus (c)	30.2 ± 2.3	31.0 ± 2.7	31.3 ± 1.8
Sinotubular junction (s)	24.1 ± 1.9	25.1 ± 3.0	25.0 ± 2.0
Sinotubular junction (c)	23.4 ± 2.1	24.7 ± 1.6	25.1 ± 1.3



Reference 3). Data measured in diastole and presented as mean ± SD in mm. Analyzed from sagittal (s) and coronal (c) SSFP LVOT cines