

Supplementary Table 1. Skills Checklists

TECHNIQUE, PHYSICAL PRINCIPLES AND MODES OF ULTRASOUND

SKILL	PERFORMS
Turning on the equipment.	
Choosing the right probe.	
Depth.	
Earnings.	
Zoom.	
Focus.	
Sector width	
Cursor	
Mode M.	
Two-dimensional mode.	
Color Doppler.	
Continuous Doppler.	
Pulsed Doppler.	
Tissue Doppler.	

APPROACHES AND ECHOCARDIOGRAPHIC VIEWS

SKILL	PERFORMS
Parasternal long axis approach	
Mitral valve M mode	
Mode M aortic valve	
Measurement of the aorta root and proximal ascending aorta	
Long axis of the RV	
Parasternal short axis approach (great vessels)	
Parasternal short axis approach (basal third)	
Parasternal short axis approach (middle third)	
Parasternal short axis approach (apical third)	
4-chamber apical approach	
5-chamber apical approach	
2-chamber apical approach	
3-chamber apical approach	
4-chamber subcostal approach	
Subcostal approach to the VCI	

RV: right ventricle , **IVC:** inferior vena cava

QUANTIFICATION

PARASTERNAL APPROACH LONG AXIS.

Measurement	Women	Men
DDVI	4.5 +/- 0.36 cm	5.0 +/- 0.41 cm
Left atrium	19-40 mm	19-40 mm
Right ventricle	7-23 mm	7-23 mm
Aortic ring	1.3 +/- 0.1 cm/m ²	1.3 +/- 0.1 cm/m ²
Sinuses of Valsalva	1.7 +/- 0.2 cm/m ²	1.8 +/- 0.2 cm/m ²
Sinotubular junction	1.5 +/- 0.2 cm/m ²	1.5 +/- 0.2 cm/m ²
Proximal ascending aorta	1.5 +/- 0.2 cm/m ²	1.6 +/- 0.3 cm/m ²
Septal wall	< 1cm	< 1cm
Back wall	< 1 cm	< 1 cm
Ventricular mass	< 95 gms/m ²	< 115 gms/m ²
Relative parietal thickness	0.42	0.42

Relative wall thickness: $2 \times \text{posterior wall} / \text{DDVI}$

Ventricular mass: $0.8 \times \{1.04 \times (\text{LVDD} + \text{PS} + \text{PP})^3 - \text{LVDD}^3\} + 0.6 \text{ g}$

PARASTERNAL APPROACH SHORT AXIS.

Measurement	Proximal	Distal
TSD	< 33 mm	< 27 mm

APICAL APPROACH.

Measurement	Women	Men
VTD VI	45 +/- 8 ml/m ²	54 +/- 10 ml/m ²
VTS VI	16 +/- 4 ml/m ²	21 +/- 5 ml/m ²
Volume AI	< 34 ml/m ²	< 34 ml/m ²
AD Volume	< 27 ml/m ²	< 32 ml/m ²

Diameter	Basal	Half	Longitudinal
Right ventricle	< 42 mm	< 36 mm	< 83 mm

SUBCOASTAL APPROACH 4 CAMERAS.

Right ventricular wall thickness	< 5 mm
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LVDD: Left ventricular diastolic diameter, **PS:** Septal wall, **PP:** Posterior wall, **RVOT:** Right ventricular outflow tract, **LV RDV:** Left ventricular end-diastolic volume, **LV ESV :** Left ventricular end-systolic volume, **LA :** Left atrium, **RA :** Right atrium

DIASTOLIC FUNCTION

SKILL	PERFORMS
E-wave measurement	
A-wave measurement	
E/A ratio	
E wave deceleration time	
Isovolumetric relaxation time	
Left atrial volume	
septal	
e' lateral	
E/e ratio	
Tricuspid regurgitation flow velocity	
Pulmonary vein flow	

Vmax: Maximum velocity, **IT:** Tricuspid regurgitation, **AI:** Left atrium, **PLI:** Filling pressures

LEFT VENTRICLE FUNCTION

SKILL	PERFORMS
Qualitative assessment (diameter/function)	
Distance E – septal wall	
LV diastolic diameter	
LV systolic diameter	
LV shortening fraction	
MAPSE	
Yes	
LVEF (biplanar)	

VENTRICULAR WALLS

SKILL	PERFORMS
<i>PARASTERNAL APPROACH LONG AXIS / 3-CHAMBER BEEKEEPING APPROACH</i>	
Anteroseptal wall	
Inferolateral wall	
<i>4-CHAMBER APICAL APPROACH</i>	
Anterolateral wall	
Inferoseptal wall	
<i>2-CHAMBER APICAL APPROACH</i>	
Anterior wall	
Lower wall	

MAPSE: Mitral annular plane systolic excursion, **LVEF:** Left ventricular ejection fraction

RIGHT VENTRICLE FUNCTION

SKILL	PERFORMS
Qualitative assessment (diameter/function)	
RV/LV ratio	
Basal diameter	
Average diameter	
Longitudinal diameter	
Eccentricity index (systole)	
Eccentricity index (diastole)	
TAPSE	
Tricuspid S	
Shortening fraction	
Tei Index	
60/60 sign	
RV wall thickness	

RV: Right Ventricle, **LV:** Left Ventricle, **TAPSE:** Mitral Annular Plane Systolic Excursion

PULMONARY HEMODYNAMICS

SKILL	PERFORMS
Estimated right atrial (IVC) pressure	
Pulmonary artery systolic pressure (PASP)	
RV outflow tract acceleration time	
Pulmonary artery diastolic pressure (PDAP) (Vmax end flow IP)	
Mean pulmonary artery pressure (PmAP) (1/3 PSAP + 2/3 PDAP)	
Mean pulmonary artery pressure (PmAP) (initial Vmax flow IP)	
Mean pulmonary artery pressure (PmAP) (90 – (0.62 X RVOT BP))	
Pulmonary vascular resistance	

IVC: Inferior Vena Cava, **PASP:** Pulmonary Artery Systolic Pressure, **RV:** Right Ventricle, **PADP:** Pulmonary Artery Systolic Pressure, **Vmax:** Maximum Velocity, **PI:** Pulmonary Regurgitation, **PADP:** Pulmonary Artery Mean Pressure, **RVOT:** Right Ventricular Outflow Tract

VALVULOPATHIES

SKILL	PERFORMS
<i>AORTIC VALVE</i>	
Morphological evaluation of the aortic valve	
Calculation of aortic valve area	
Mean gradient and Vmax across the aortic valve	
Aortic valve dimensionless index	
Qualitative and semi-quantitative criteria for aortic insufficiency	

Holodiastolic flow descending aorta	
<i>MITRAL VALVE</i>	
Morphological evaluation of the mitral valve	
Calculation of the mitral valve area	
Mean gradient across the mitral valve	
Qualitative and semi-quantitative criteria for mitral regurgitation	
Reverse holosystolic flow pulmonary veins	
<i>PULMONARY VALVE</i>	
Morphological evaluation of the pulmonary valve	
Maximum gradient across the pulmonary valve	
Qualitative and semi-quantitative criteria for pulmonary insufficiency	
<i>TRICUSPID VALVE</i>	
Morphological evaluation of the tricuspid valve	
Mean gradient across the tricuspid valve	
Qualitative and semi-quantitative criteria for tricuspid regurgitation	
Reverse holosystolic flow suprahepatic veins	

V_{max}: Maximum speed

PERICARDIAL EFFUSION

SKILL	PERFORMS
Basic projections for its measurement	
Right ventricular outflow tract collapse	
Right atrial collapse	
Transmitral flow variSKILL	
Transtricuspid flow variSKILL	
Assessment of the inferior vena cava	

LUNG ULTRASOUND

SKILL	PERFORMS
Use appropriate probe	
Orientation and depth	
8-point BLUE protocol	
Sign of the Bat	
Evaluation of pleural sliding	
Beach sign	
Curtain sign	
Profile A	
Profile B	
Consolidation	
Pleural effusion	
Pneumothorax	
BLUE Protocol	
FALLS Protocol	
Diaphragmatic excursion	
Diaphragmatic thickness	
Diaphragmatic thickening fraction	
Diaphragmatic contraction velocity	

ANSWER TO VOLUME AND EVALUATION OF VENOUS CONGESTION

SKILL	PERFORMS
VCI Collapsibility Index	
IVC distensibility index	

VCI variSKILL index	
VariSKILL of the LVOT flow ITV	
VariSKILL of Vmax of LVOT flow	
Stroke volume variSKILL	
Suprahepatic vein flow assessment	
Portal vein flow evaluation	
Evaluation of renal venous flow	

IVC: Inferior vena cava, **ITV:** Velocity-time integral, **LVOT:** Left ventricular outflow tract, **Vmax:** Maximum velocity