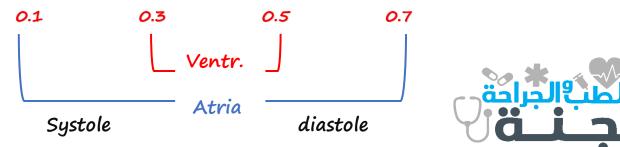
Cardiac cycle

Vocabularies :

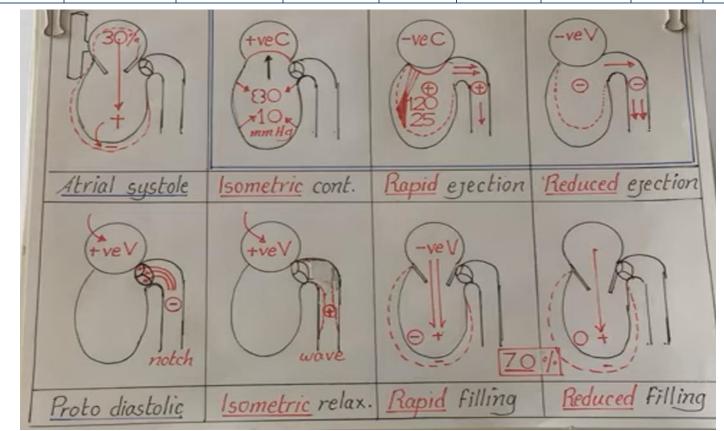
- Systole: cardiac muscle contraction.
- Diastole: cardiac muscle relaxation. (rest) (coronary blood flow)
- End Diastolic volume (EDV): It is defined as the maximum amount of blood in the ventricles at the end of the ventricular diastole. <u>No more blood will be added to the ventricles during this cycle.</u>
 <u>It is about 140 ml.</u>
- End Systolic volume (ESV): Amount of blood remaining in the ventricles at the end of systole when ejection is complete. It is about 70 ml. This is <u>the least amount of blood</u> that the ventricle will contain during this cycle.
- Stroke volume (SV): Amount of blood pumped out of each ventricle
 with each contraction.
 SV = EDV ESV = 140 70 = 70 ml
- Ejection fraction (EF): It is the fraction of the end diastolic volume that is ejected out with each contraction. It usually equals 70%.
- Dicrotic notch: At the onset of ventricular diastole, closure of the aortic valve produces a disturbance or notch on the aortic pressure curve. This is caused by backward flow of blood (due to elastic recoil in the aortic walls) immediately before closure of the aortic valve followed by sudden stoppage of back flow. (Incisura)



	systolic				diastolic			
phase	Atrial	Isometric	Rapid	Reduc.	Proto-	Isometric	Maxi.	Reduc.
pruse	contraction	iso-	maxi.	mini.	diastolic	relaxa-	rapid	filling
		volumetric	ejection	ejection	phase	tion	filling	
duration	0.1 Sec	0.05 sec	0.15 sec	0.1 sec	0.04 sec	0.06 sec	0.1 sec	0.2 sec
	the atria	closure of	opening	the	From	closure	openin	10% of
	contract	AV valve ,	AV,	30% SV	end of	of AV ,	g of	SV flow
Events	and pump	ventricles	rushing	is	ventric-	and the	AV	slowly
	30% of the	contract	blood into	ejected	ular	ventricles	valve	to the
	ventricular		aorta	to	systole	relax	60%	ventricl
	filling	filling	70% SV	aorta.	to	isometri-	sv	e
					closure	cally		
					of AV			
The atrial	rise from <mark>4</mark>	Rise,				increased		
pressure	to 8 mmHg	bulging of				above	-	-
	and return	AV and	decrease	Increas	-	the		
	to 4 mmHg	regurgitati		e		ventricul		
	(evacuation)	on of blood				ar		
		into atria				pressure		
Ventricular	rise from 4		rise from	reach	Decreas	falls	around	rises to
pressure	to 8 mmHg	rise from 4	80	max.	-es	rapidly	zero	4
	and return	to 80	to 120	then	about	from 90		mmHg
	to 4 mmHg	mmHg	mmHg	decrea-	20	to O		
	(evacuation)			se	mmHg	mmHg		
Ventricular	Increased			Decreas			increas	increase
volume	by (20 ml)	constant	decrease	e to	constant	-	ed	graduall
	to reach	(isometric)		ESV =				y
	EDV = 140			70 ml				



Heart	S4	first	Second	-	-	S2	S3	-
sounds		component	compone					
		s S1	nts SI					
					AV	Both	AV	
Valves	Semilunar		Semilunar		closed	closed at	closed	
	closed , AV	Both	opened ,	-	at the	the	at the	-
	opened .	closed	AV closed		end.	beginnin	beginni	
					Semilu-	g,SL	ng	
					nar	then		
					close.	open		
ECG	P wave	QRS	Beginning	-	T wave	end of T	-	-
		complex	of T wave		(slop)	wave		
				1	1		1	



- P wave of ECG \rightarrow <u>atrial contraction</u>
- QRS complex waves of ECG → <u>ventricular depolarization</u>



• T wave → <u>ventricular repolarization</u> (after QRS complex)

- S1 \rightarrow due to closure of the AV valves. Loudest at mitral area
- s2 \rightarrow due to closure of semilunar valves
- S3 \rightarrow due to rushing of blood into the ventricles (when dilated)
- S4 → due to vibration of atrial muscle during the contraction (late diastole)
- In phase 2 isometric : same length
- In phase 3 & 4 isotonic : same tension

