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PULMONARY ARTERIAL HYPERTENSION

DIAGNOSIS DAN PENATALAKSANAAN



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Fakultas Kedokteran, Keperawatan dan Kesehatan Masyarakat

UGM/RSUP DR SARDJITO YOGYAKARTA

POKJA HIPERTENSI PULMONAL PERKI



Apa itu Hipertensi PARU ?

Hipertensi PARU : peningkatan tekanan pembuluh darah paru yang disebabkan oleh restriksi aliran darah yang melewati sirkulasi pembuluh darah paru. (Mc Laughin *et al*, 2009)

Pulmonary Hypertension



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Penyakit yg jarang ditemui

Peningkatan tekanan darah pembuluh darah paru secara progresif

Jika diabaikan, menyebabkan gagal jantung kanan dan kematian



Tentang PH

>25 juta
penduduk dunia
menderita PH

52/1 juta org
menderita Pulmonary
Arterial Hypertension
(PAH)

Sering dianggap
penyakit paru
lain → dx
tertunda ± 2 tahun

50% meninggal dalam
2 th tanpa
pengobatan

2x lebih sering dialami
perempuan

KLASIFIKASI KLINIS HIPERTENSI PARU

5th WSPH Nice 2013



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1. Pulmonary arterial hypertension (PAH)

1.1 Idiopathic

1.2 Heritable

1.2.1 BMPR 2

1.2.2 ALKI, ENG, SMAD9, KNCK 3

1.2.3 Unknown

1.3 Drugs and toxins induced

1.4 Associated with (APAH)

1.4.1 Connective tissue diseases

1.4.2 HIV infection

1.4.3 Portal hypertension

1.4.4 Congenital Heart diseases

1.4.5 Schistosomiasis

1 *Pulmonary veno-occlusive disease and/or pulmonary capillary haemangiomatosis

1 **Persistent pulmonary hypertension of the newborn

2. Pulmonary hypertension due to left heart disease

2.1 Left Ventricular systolic dysfunction

2.1 Left Ventricular diastolic dysfunction

2.3 Valvular disease

2.4 Congenital/acquired left heart inflow/outflow tract obstruction and congenital cardiomyopathies

3. Pulmonary hypertension due to lung disease and/or hypoxia

3.1 Chronic obstructive pulmonary disease

3.2 Interstitial lung disease

3.3 Other pulmonary disease with mixed restrictive and obstructive pattern

3.4 Sleep-disordered breathing

3.5 alveolar hypoventilation disorders

3.6 Chronic Exposure to high altitude

3.7 Developmental abnormalities

4. Chronic thrombotic pulmonary hypertension

5. PH with unclear multifactorial mechanisms

5.1 Haematological disorders: Chronic haemolytic anemia, myeloproliferative disorders, splenectomy.

5.2 Systemic disorders : sarcoidosis, pulmonary histiocytosis, lymphangiomyomatosis

5.3 Metabolic disorders: Glycogen storage disease, Gaucher disease, thyroid disorders

5.4 Others : tumor obstruction, fibrosing mediastinitis, chronic renal failure, segmental PH

Group 1 PH: Pulmonary Artery Hypertension



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1. Hipertensi Arteri Pulmonal

1. Idiopatik
2. Diturunkan
 1. Mutasi BMPR2
 2. Mutasi Lainnya
3. Akibat Obat dan Toksin
4. Berhubungan dengan:
 1. Penyakit jaringan ikat
 2. Infeksi Human immunodeficiency virus (HIV)
 3. Hipertensi Porta
 4. Penyakit Jantung Bawaan
 5. Schistosomiasis

1.` Penyakit Oklusi vena pulmonal dan/atau hemangiomatosis kapiler pulmonal

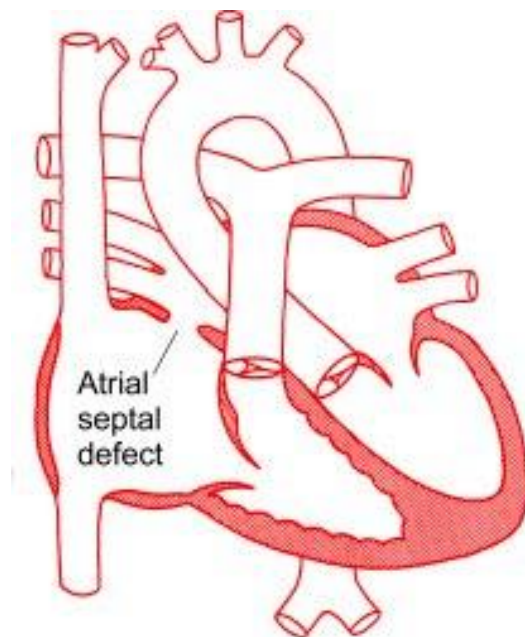
1. Idiopatik
2. Diturunkan
 1. Mutasi EIF2AK4
 2. Mutasi Lainnya
3. Akibat Obat dan Toksin
4. Berhubungan dengan:
 1. Penyakit jaringan ikat
 2. Infeksi Human immunodeficiency virus (HIV)

1.`` Hipertensi Pulmonal Persisten pada Neonatus

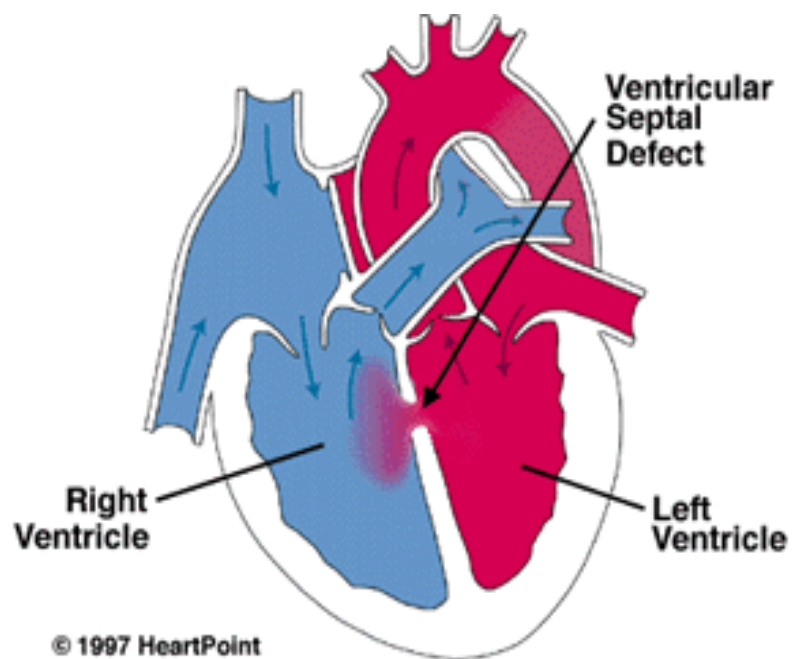


PENYAKIT JANTUNG BAWAAN

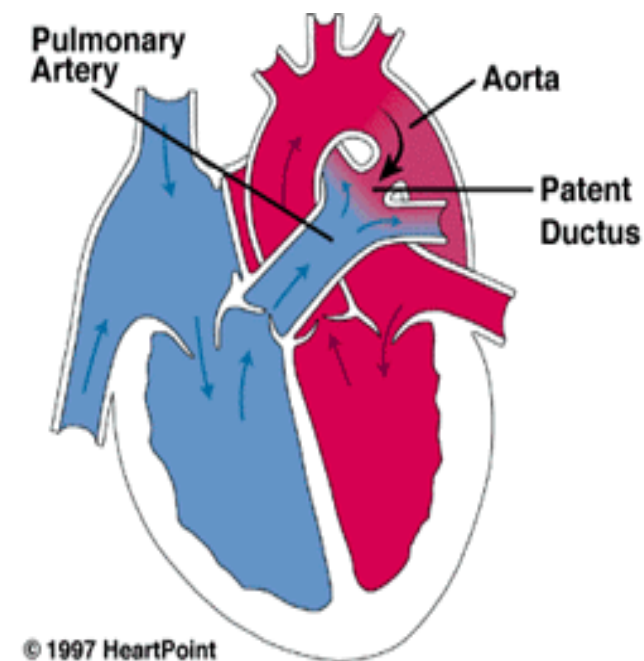
ASD



VSD

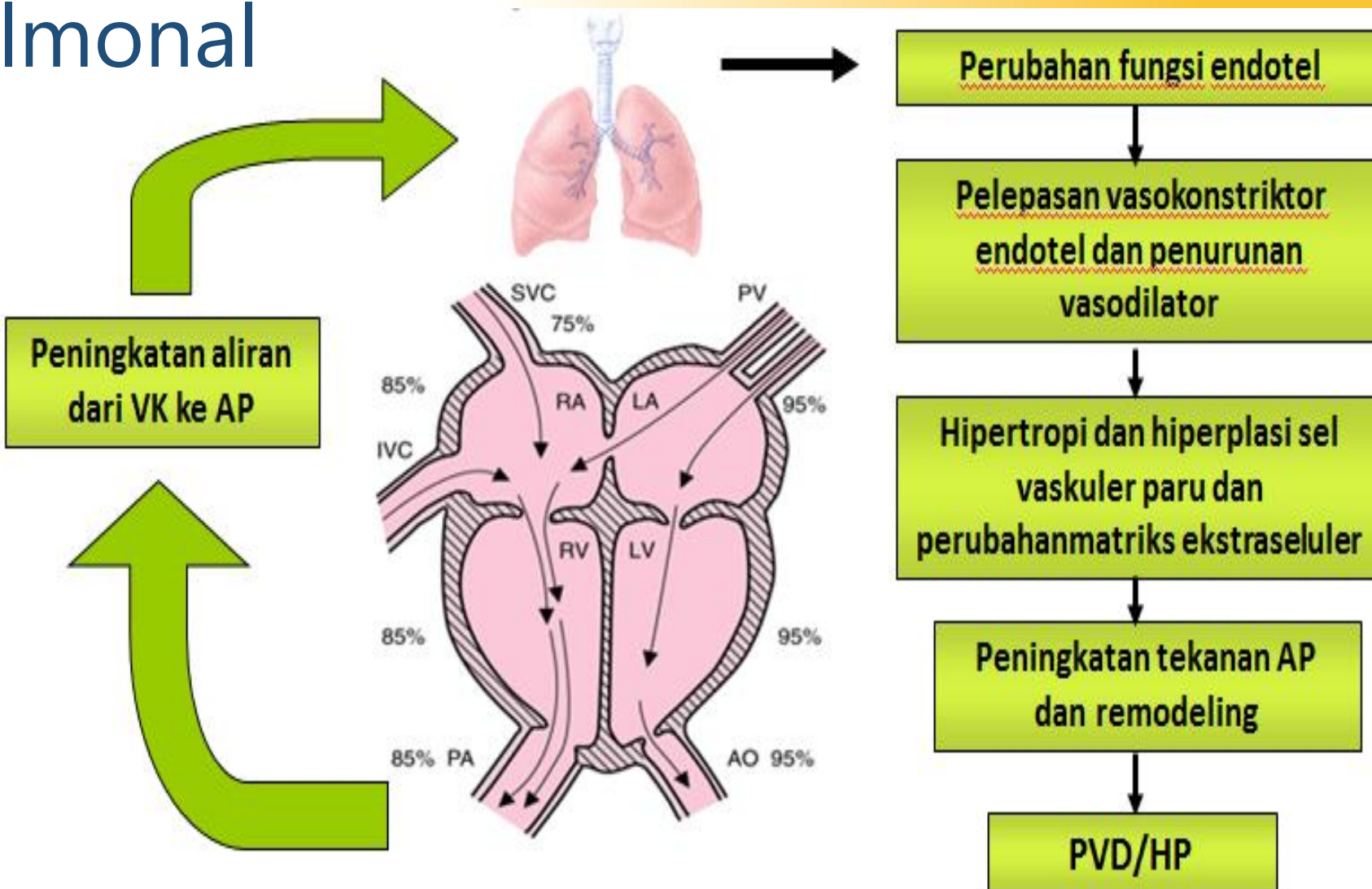


PDA



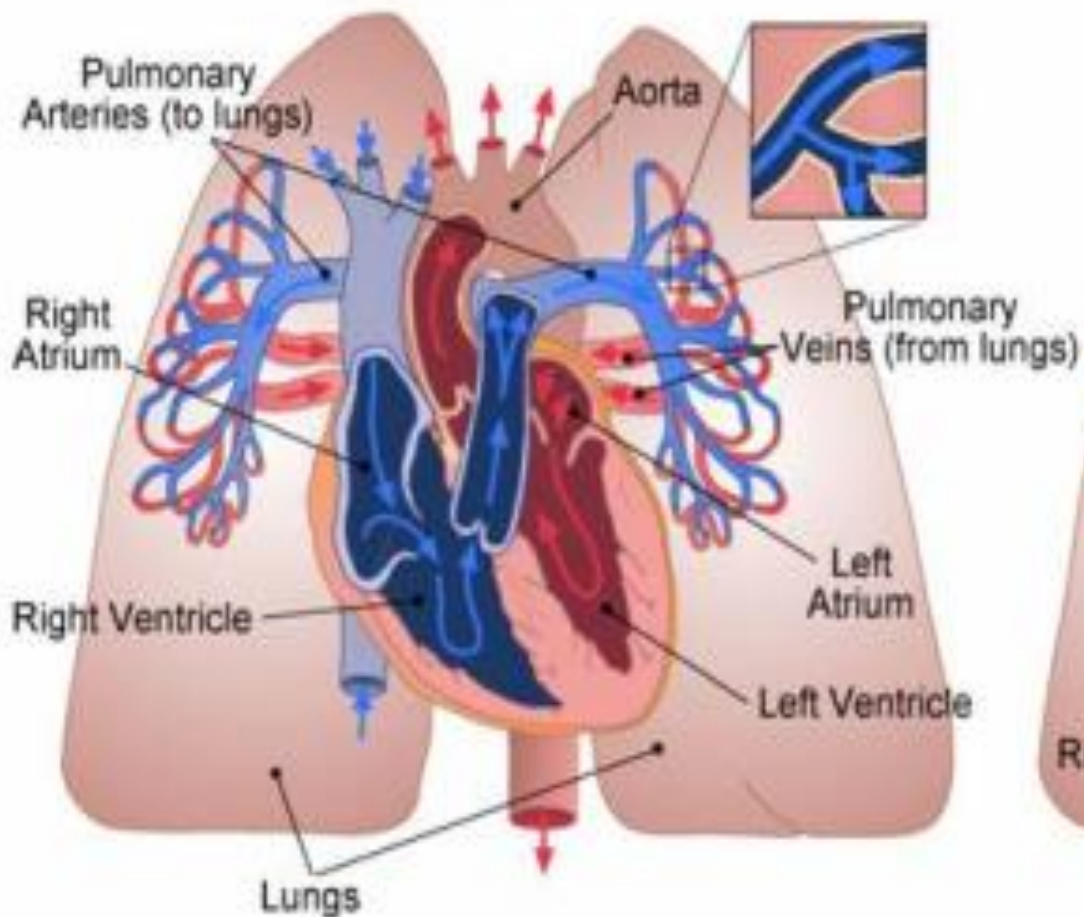


Mekanisme Terjadinya Hipertensi Pulmonal

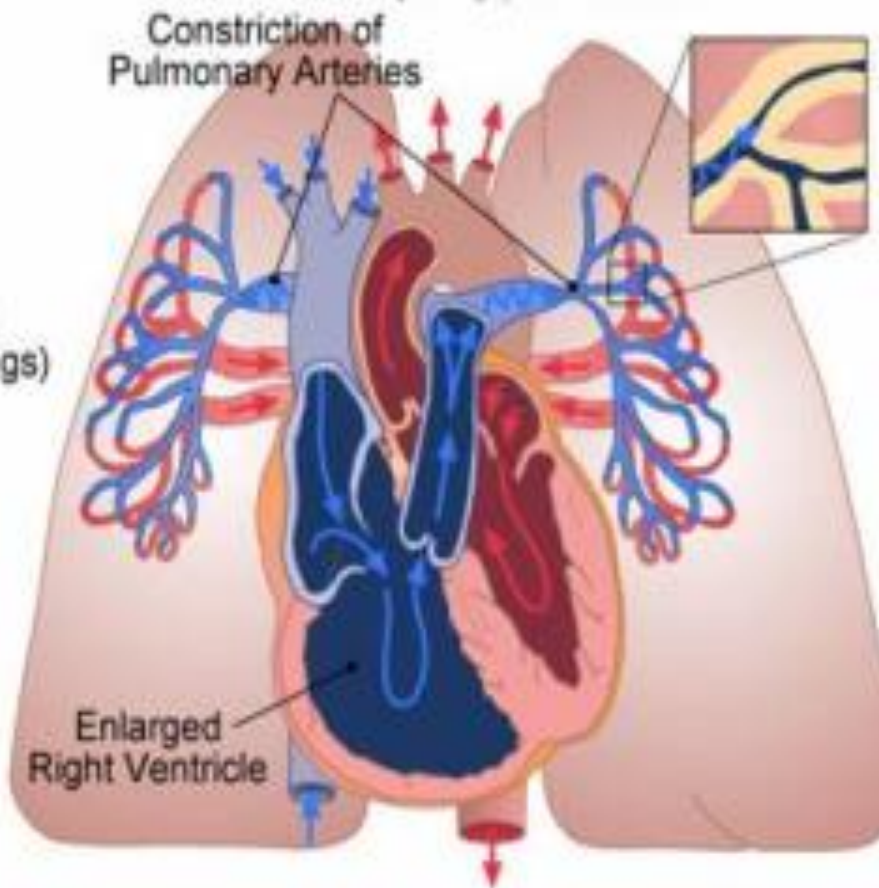


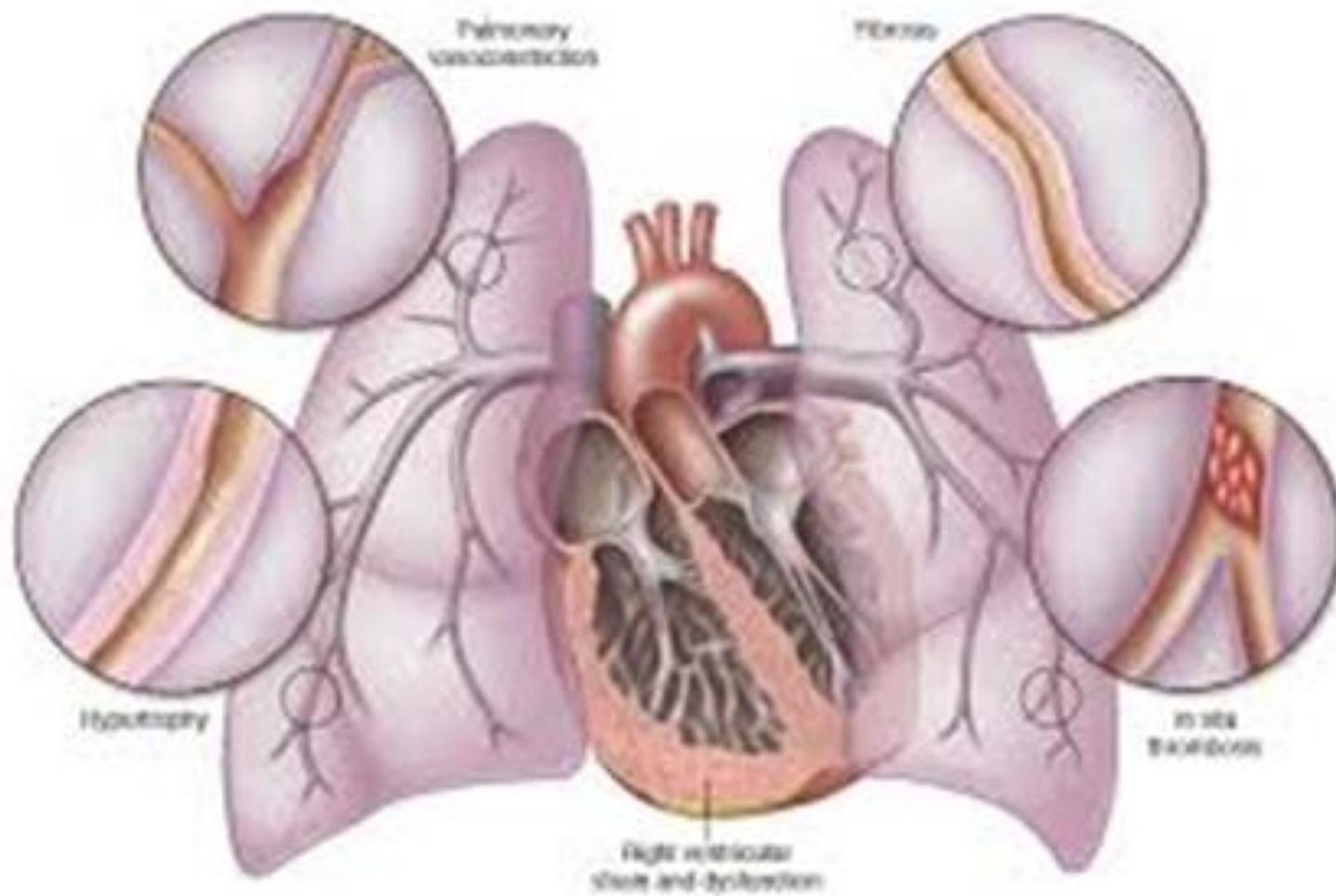


Normal Heart



Pulmonary Hypertension



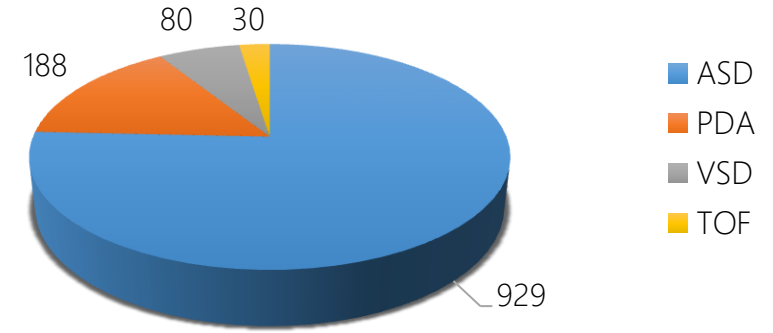


COHARD – PH Registry

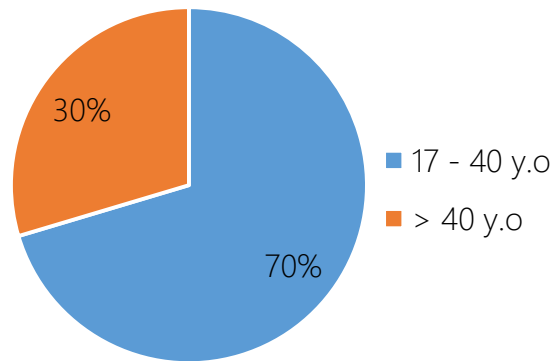
July 2012 – August 2020

(Dinarti, LK. et al , unpublished data, 2020)

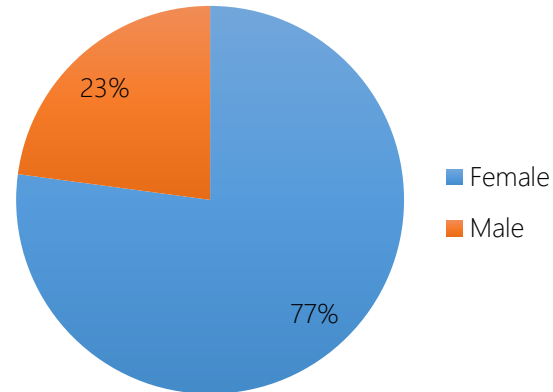
Total Pasien PJB



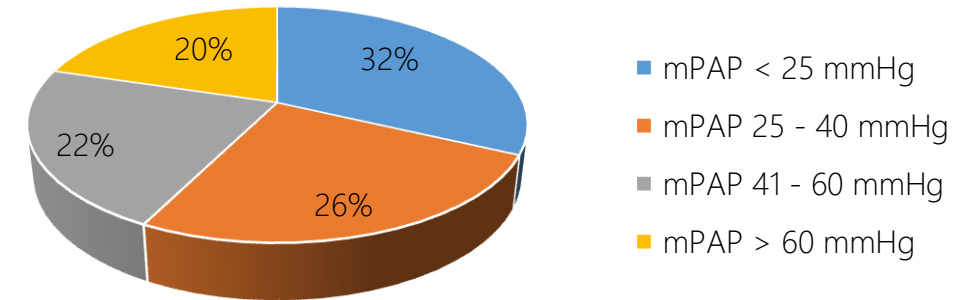
Usia Pasien PJB



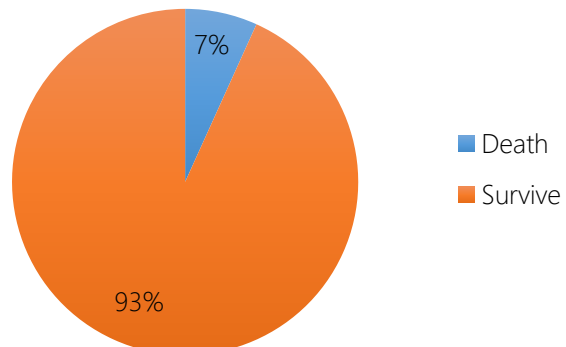
Jenis Kelamin Pasien PJB



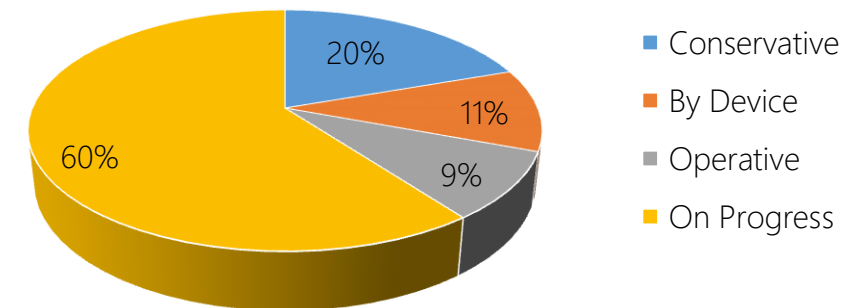
Hipertensi Paru Berdasarkan RHC



PH Mortality



Tatalaksana

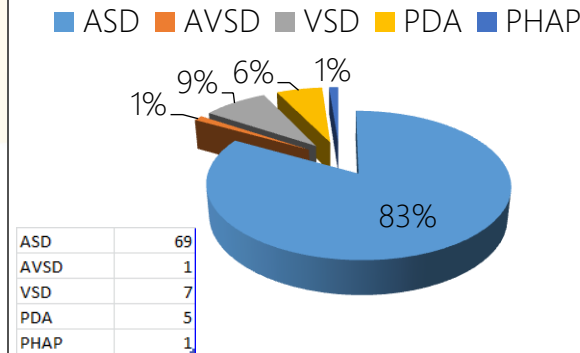


Maternal Congenital Heart Disease

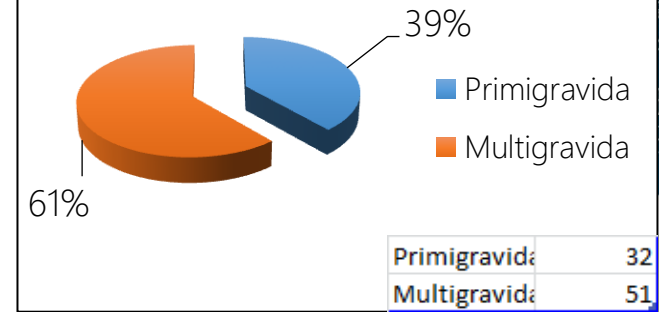
(Dinarti, LK., unpublished data, 2018)



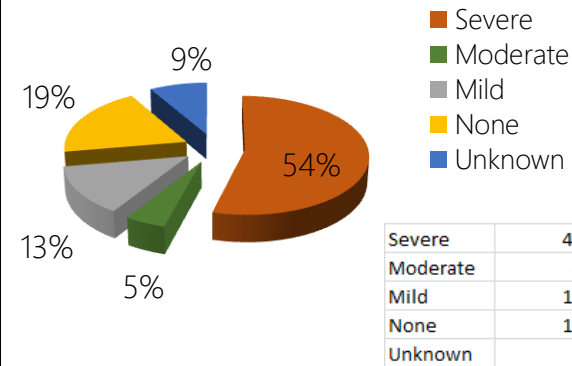
Tipe PJB Maternal



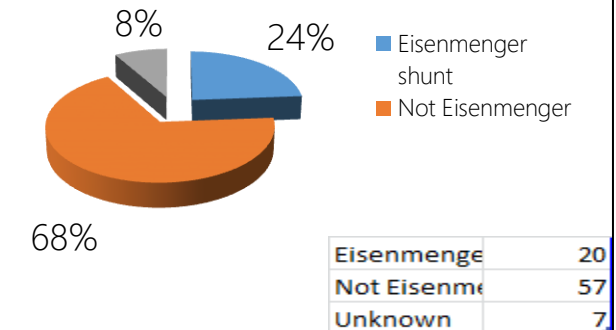
Diagnosis PJB pada Paritas



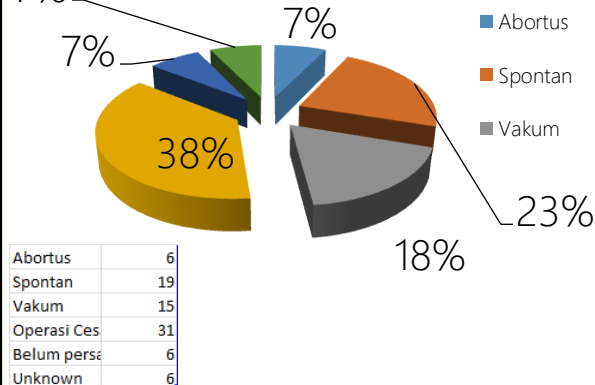
Derajat PH pada Ibu PJB



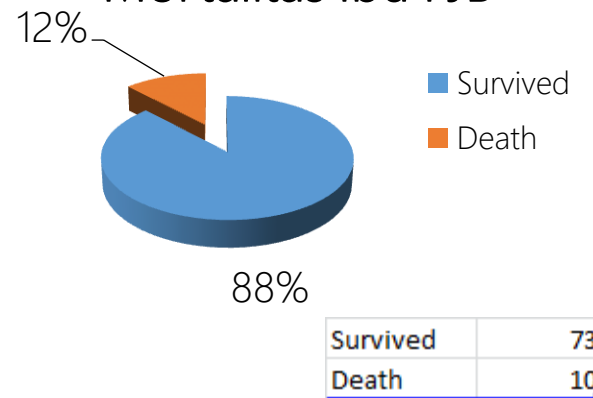
Eisenmenger pada Ibu PJB



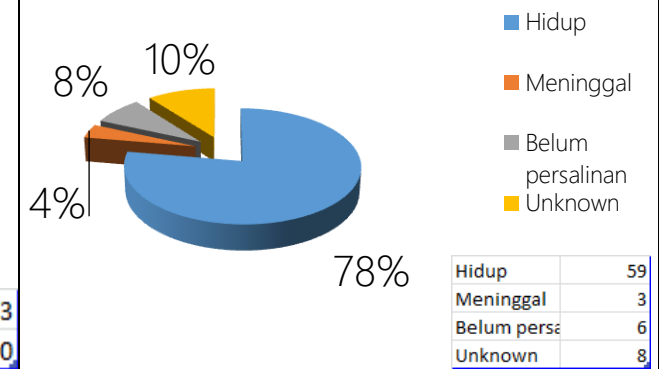
Metode Persalinan pada Ibu PJB



Mortalitas Ibu PJB



Mortalitas Neonatal Ibu PJB



TANDA DAN GEJALA PH



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•Sesak napas

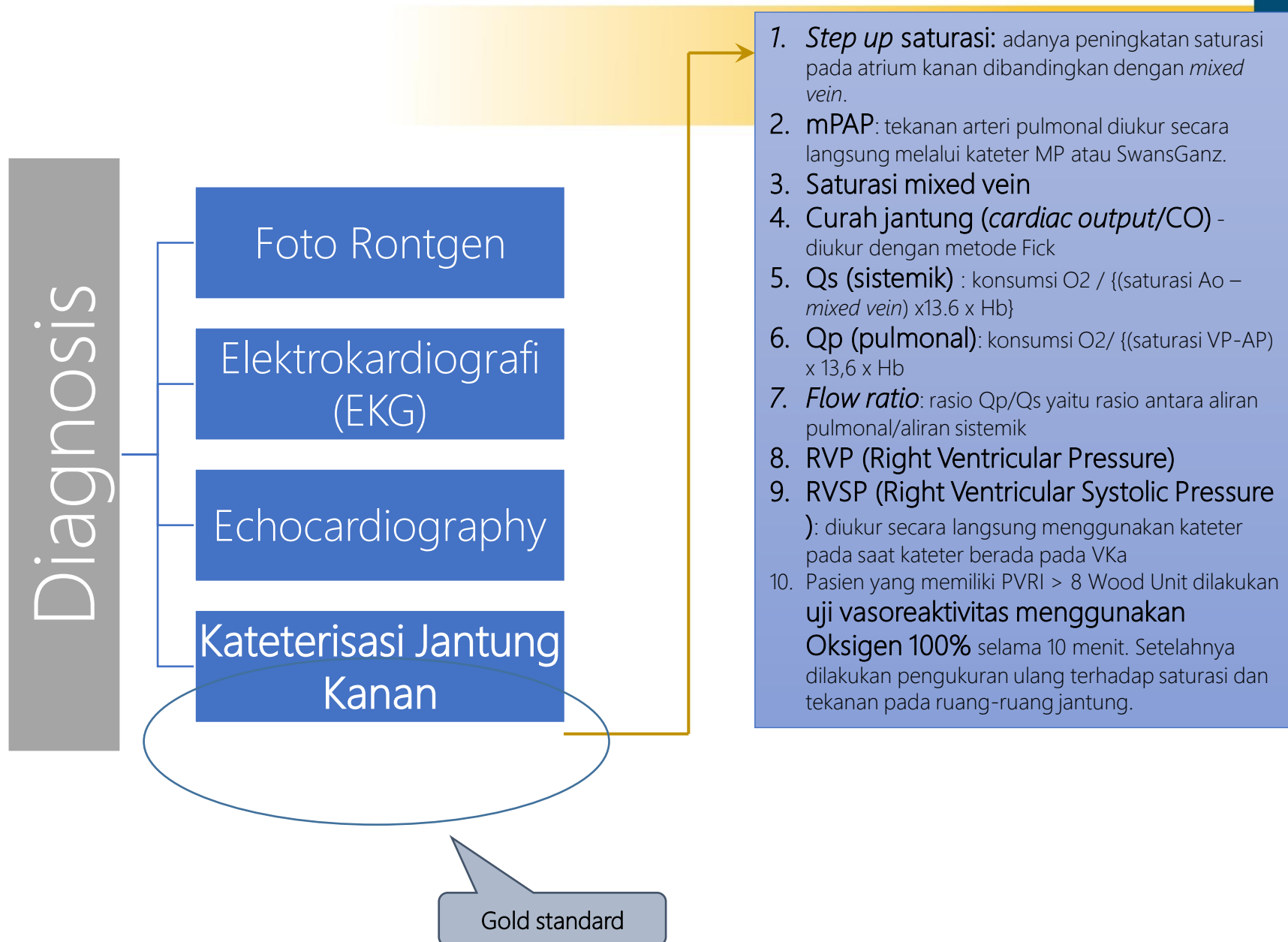
Bibir kebiruan

Mudah lelah

Pingsan

Kaki bengkak

Kuku menggembung



ECG Impression: Normal sinus rhythm, rate 67. Right axis deviation. Right atrial enlargement. RVH with ST-T abnormalities

PR Interval: 189

QT Interval: 413

Axes: P: 40

ST: -56

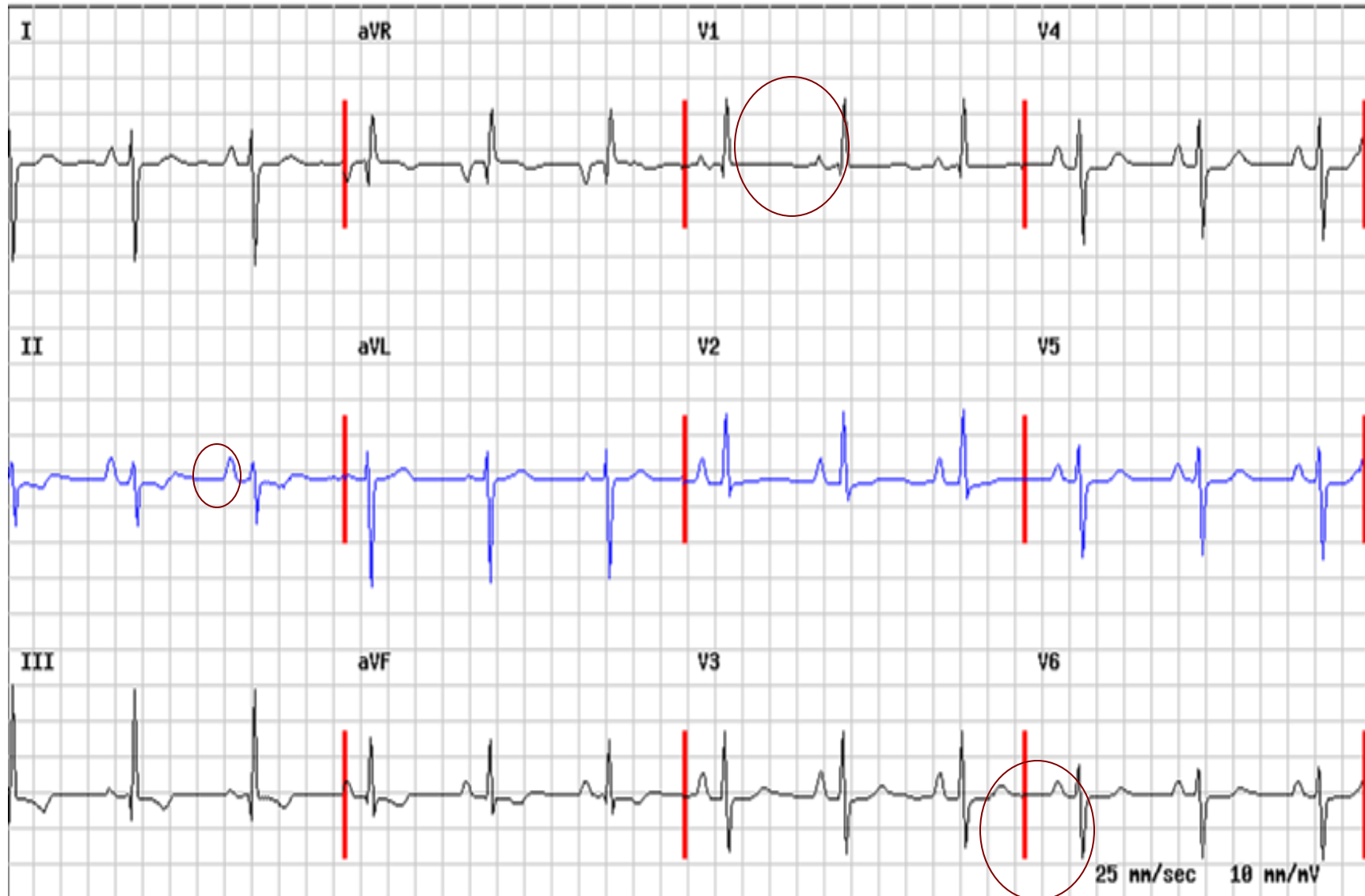
QRS Duration: 85

QT Interval Corrected: 436

MEAN QRS: 156

T: -32

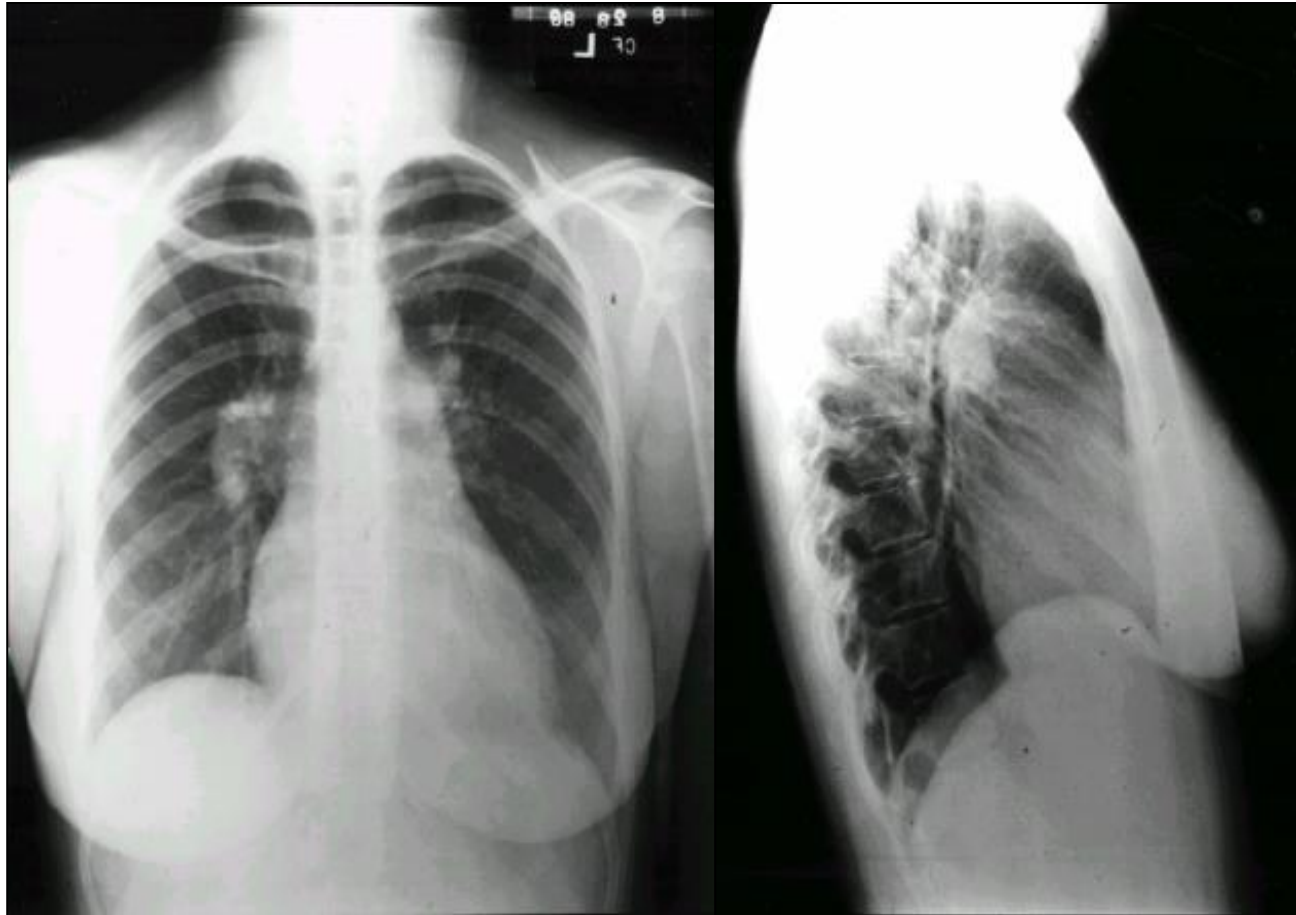
ECG Severity: - ABNORMAL ECG -



RONSEN FOTO THORAKS



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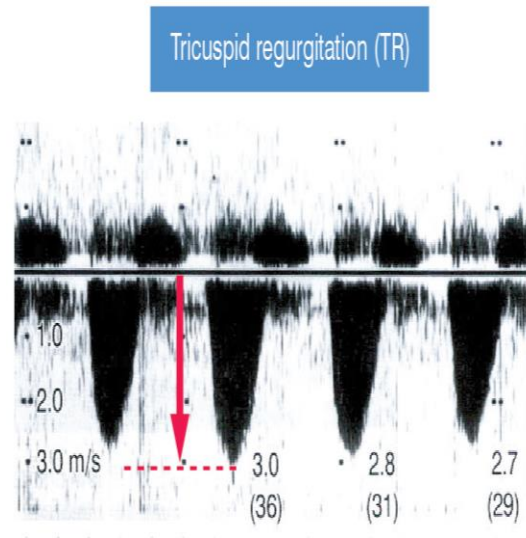
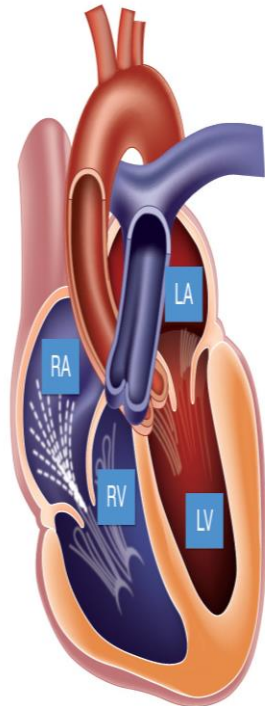
- CXR:
 - large proximal PA with peripheral tapering (pruning)
 - cardiomegaly due to enlarged RA, RV
 - pleural effusion is uncommon

Echocardiography – value as a SCREENING tool



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Echocardiography in PAH

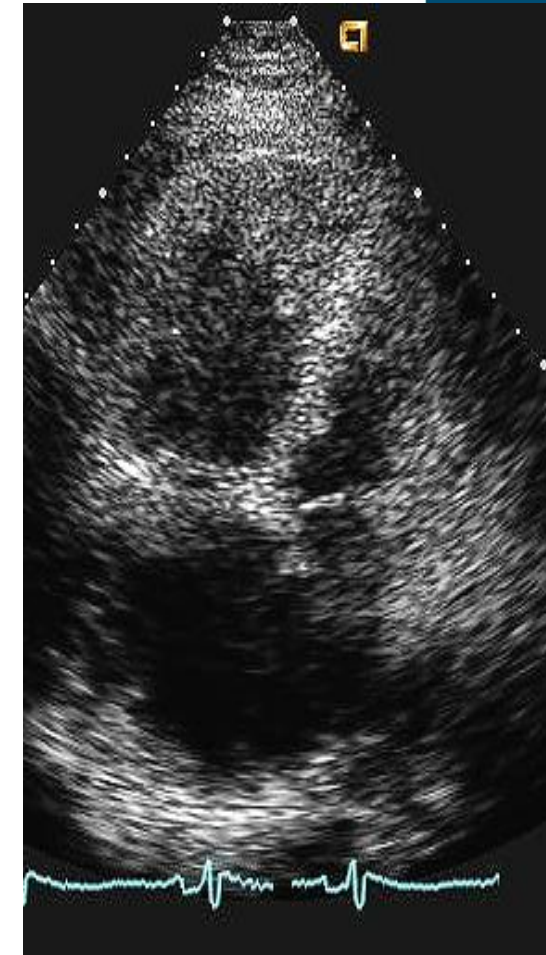
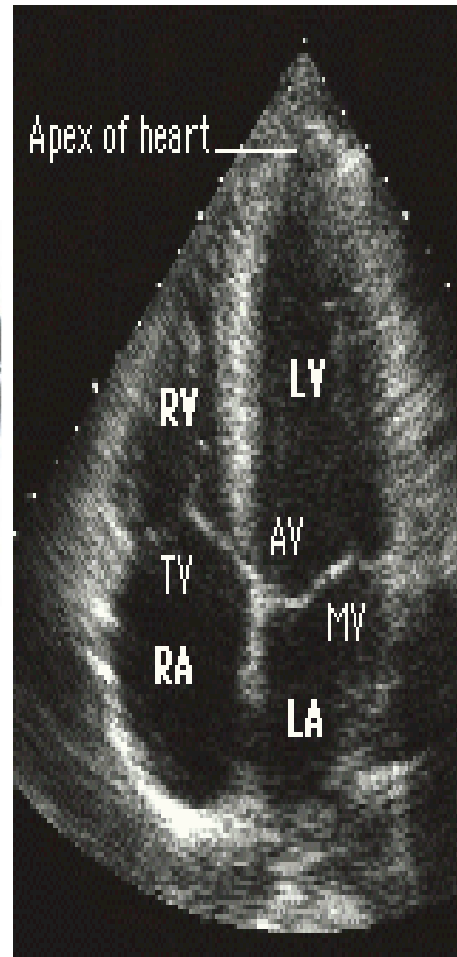


TR jet velocity (v)

Syst PAP = Right ventricular systolic pressure

(in absence of pulmonary outflow obstruction)

$$RVSP = 4v^2 + RAP^*$$



KATETERISASI JANTUNG KANAN



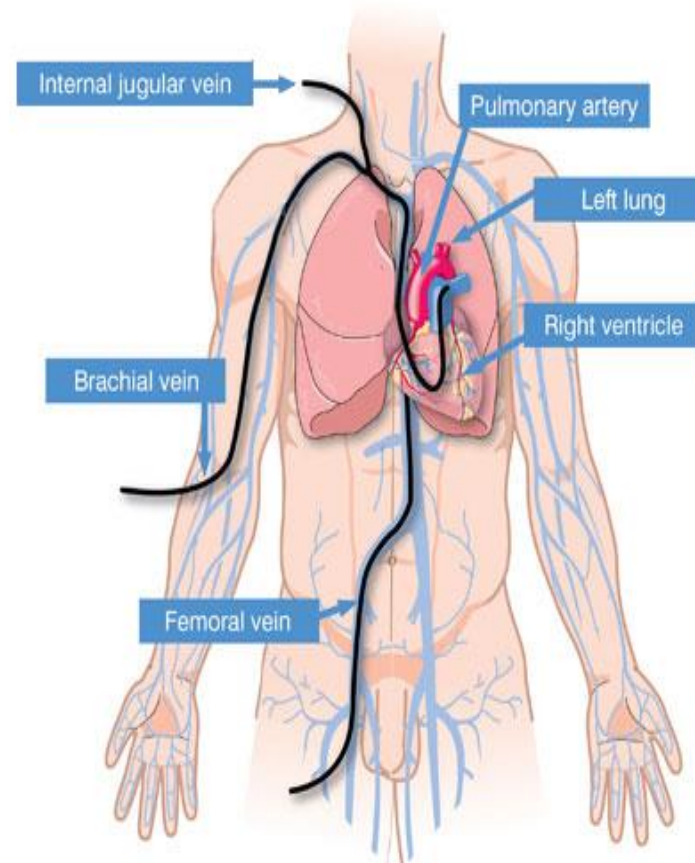
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Right heart catheterization

Right heart catheterization is required to confirm the diagnosis of PAH.

PAH is defined by

- mPAP ≥ 25 mmHg at rest
- PCWP ≤ 15 mmHg



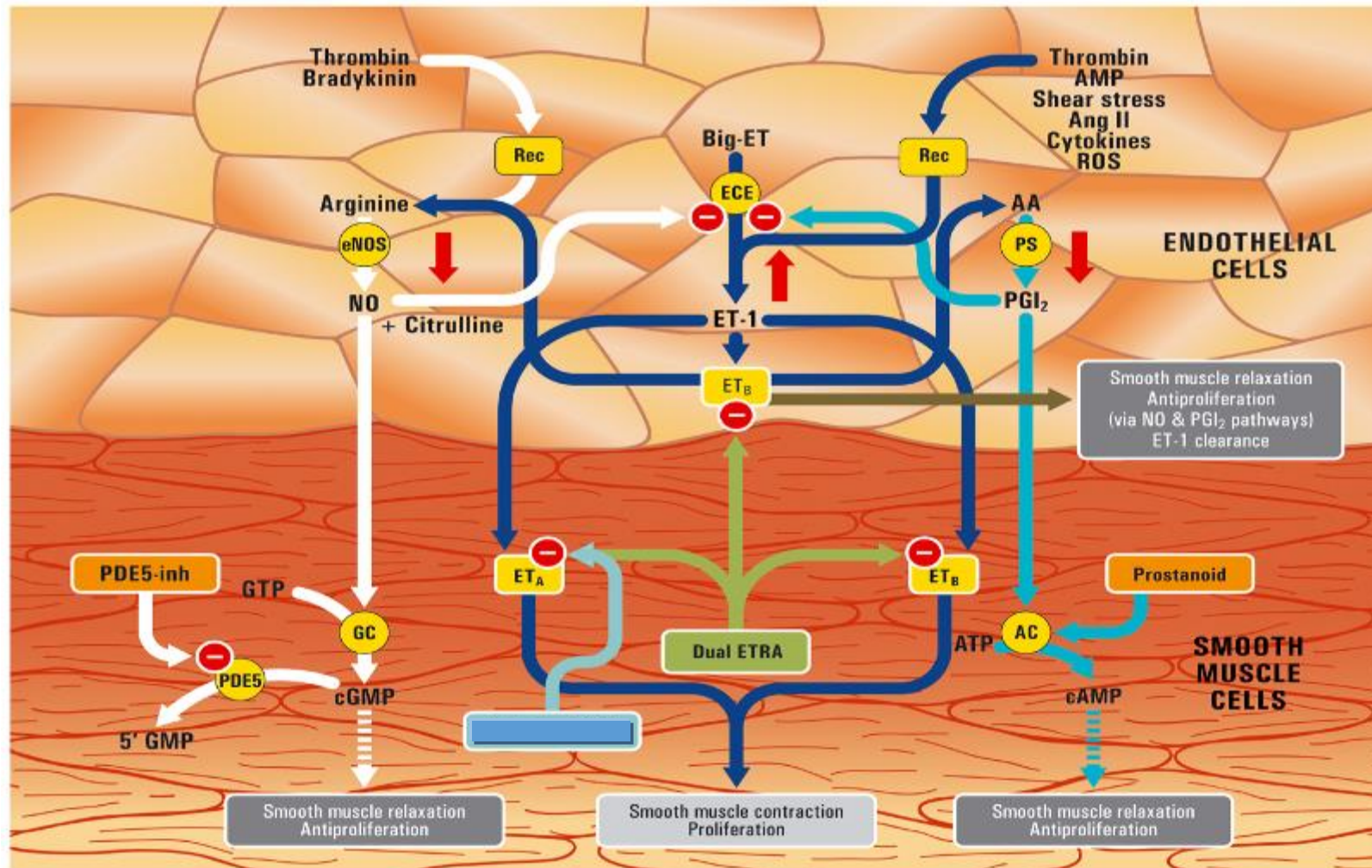
Standard approaches for catheter access

Galié et al. *Eur Heart J* 2009.

Three pathogenic pathways in PAH



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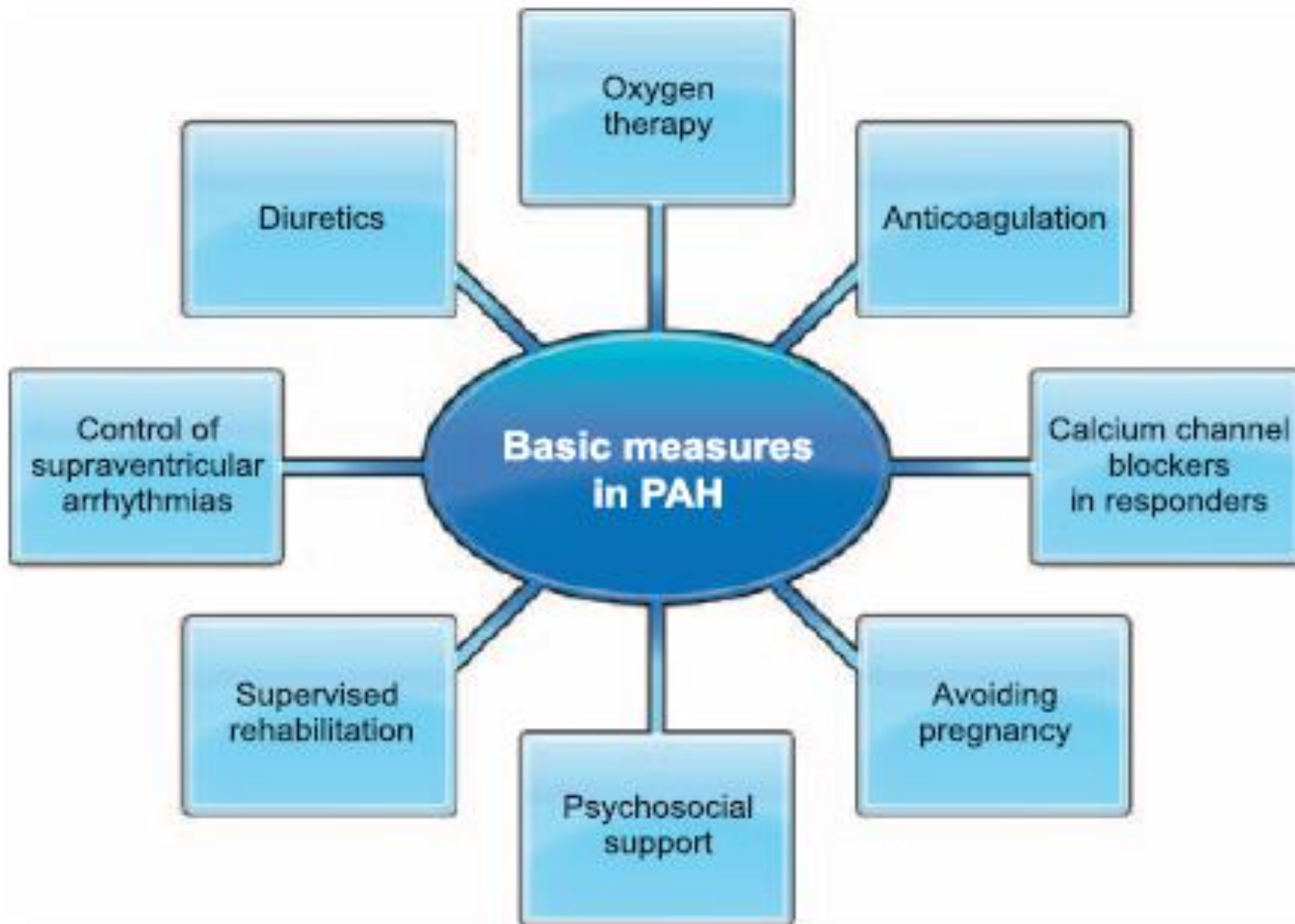


AA = arachidonic acid; AC = adenylyl cyclase;
AMP = adenosine monophosphate;
Ang II = angiotensin II;
ATP = adenosine triphosphate;
cGMP = cyclic guanosine monophosphate;
ECE = endothelin converting enzyme;

eNOS = endothelial nitric oxide synthase;
ET-1 = endothelin-1;
ET_{A/B} = endothelin A/B receptor;
ETRA = endothelin receptor antagonist;
5' GMP = 5'-guanosine monophosphate;
GC = guanylate cyclase;

GTP = guanosine triphosphate;
inh = inhibitor; NO = nitric oxide;
PAH = pulmonary arterial hypertension;
PDE5 = phosphodiesterase type 5;
PGI₂ = prostacyclin;
PS = prostacyclin synthase;
Rec = receptor;
ROS = reactive oxygen species

Terapi suportif



Efficacy of drug monotherapy, for PAH (Group 1)

Recommendations			Class - Level						
Measure/treatment			WHO-FC II		WHO-FC III		WHO-FC IV		
Calcium channel blockers			I	C	I	C	-	-	
Endothelin receptor antagonists	Ambrisentan		I	A	I	A	IIb	C	
	Bosentan		I	A	I	A	IIb	C	
	Macitentan ^d		I	B	I	B	IIb	C	
Phosphodiesterase type-5 inhibitors	Sildenafil		I	A	I	A	IIb	C	
	Tadalafil		I	B	I	B	IIb	C	
	Vardenafil*		IIb	B	IIb	B	IIb	C	
Guanylate cyclase stimulators	Riociguat		I	B	I	B	IIb	C	
Prostanoids	Epoprostenol	intravenous ^d	-	-	I	A	I	A	
	Iloprost	Inhaled	-	-	I	B	IIb	C	
		Intravenous*	-	-	IIa	C	IIb	C	
	Treprostinil	subcutaneous		-	-	I	B	IIb	C
		Inhaled*		-	-	I	B	IIb	C
		Intravenous ^e		-	-	IIa	C	IIb	C
		Oral*		-	-	IIb	B	-	-
Beraprost*		-	-	IIb	B	-	-		
IP-receptor agonists	Selexipag (oral)*		I	B	I	B	-	-	

^dOnly in responders to acute vasoreactivity tests; Class I for idiopathic PAH, heritable PAH and PAH due to drugs; Class IIa for APAH conditions. - ^eTime to clinical worsening as primary end-point in RCTs or drugs with demonstrated reduction in all-cause mortality. - ^fIn patients not tolerating the subcutaneous form.

*This drug is not approved by the EMA at the time of publication of these guidelines.



ERS

RESPIRATORY SOCIETY



EUROPEAN SOCIETY OF CARDIOLOGY*

Efficacy of initial drug combination therapy, for PAH (Group 1)

Recommendations	Class - Level					
	WHO-FC II		WHO-FC III		WHO-FC IV	
Measure/treatment	I	B	I	B	IIb	C
Ambrisentan + tadalafil ^c	I	B	I	B	IIb	C
Other ERA + PDE-5i	IIa	C	IIa	C	IIb	C
Bosentan + sildenafil +i.v. epoprostenol	-	-	IIa	C	IIa	C
Bosentan + i.v. epoprostenol	-	-	IIa	C	IIa	C
Other ERA or PDE-5i + s.c. trepostinil	-	-	IIb	C	IIb	C
Other ERA or PDE-5i + other i.v. prostacyclin analogues	-	-	IIb	C	IIb	C

^cTime to clinical failure as primary end-point in RCTs or drugs with demonstrated reduction in all-cause mortality (prospectively defined).





KETERSEDIAAN OBAT PAH di INDONESIA

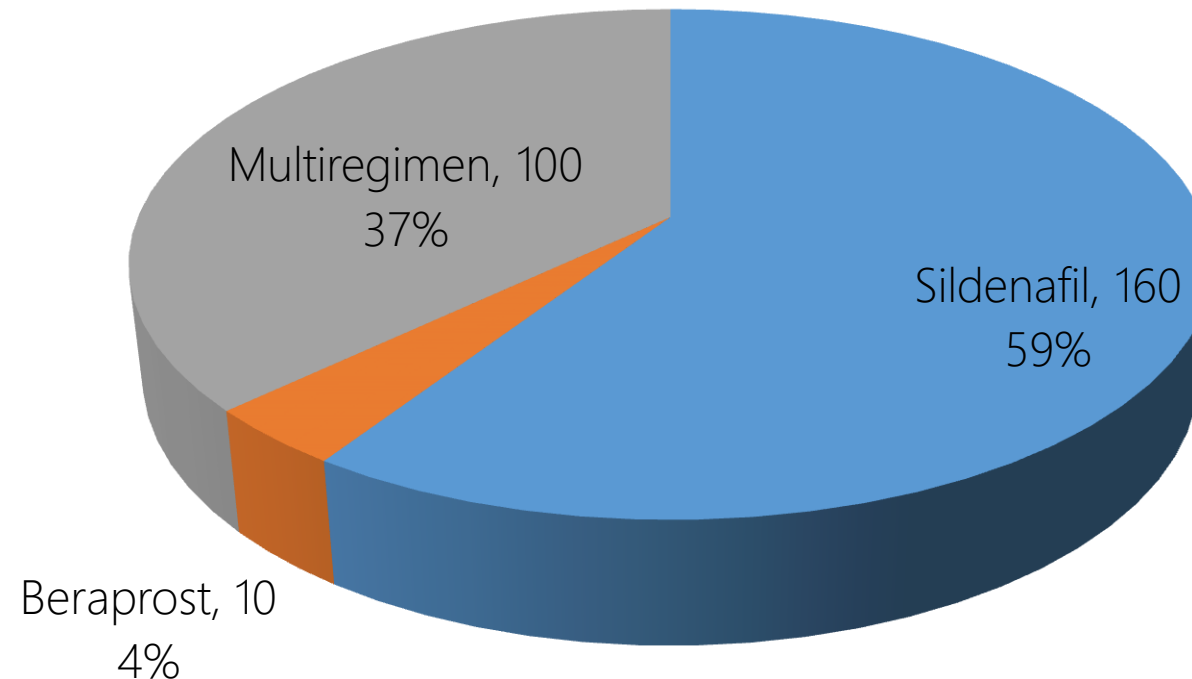
ENDOTHELIN PATHWAY	BOSENTAN ET AL	IA	-
Nitric Oxide (NO) PATHWAY	SILDENAFIL 20MG	IA	REVATIO®
PROSTACYCLIN PATHWAY	BERAPROST ILOPROST INHALED	2b - B 1 - B	DORNER® VENTAVIS®

Conservative Therapy di RSUP Dr.Sardjito Yogyakarta



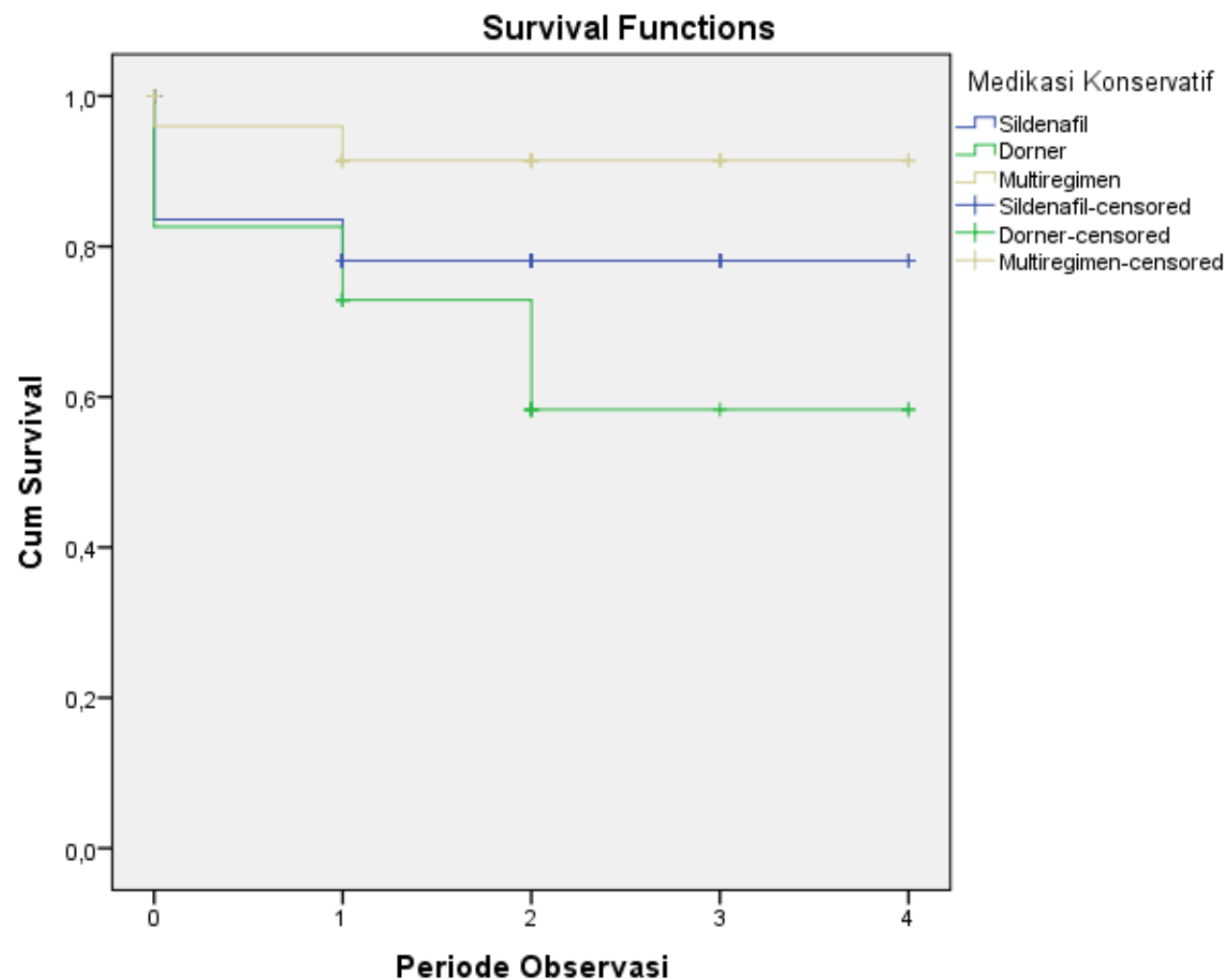
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Conservative





KESINTASAN (SURVIVAL)





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GENERAL AWARENESS



Community
Service

Education

Research
Collaboration

LOCALLY ROOTED, GLOBALLY RESPECTED

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Thank You



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Curriculum Vitae

PERSONAL INFORMATION

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Sex : Female | Date of birth : March 2nd, 1961 | Nationality : Indonesia

Marital Status : Married

PERSONAL INTERESTS

1. Echocardiography
2. Pulmonary Arterial Hypertension
3. Congenital Heart Diseases
4. Pregnancy and Heart Diseases