Winter 2023

GP Connect

Supporting best practice in cardio-metabolic health

Sydney Cardiology

From the editor – Dr Gunjan Aggarwal

Specialising in general adult cardiology and non-invasive cardiac imaging, particularly echocardiography and cardiac computed tomography (CT).

Welcome to the winter 2023 edition of GP Connect. This issue provides the latest clinical guidance on managing congestive cardiac failure and pulmonary hypertension for General Practitioners.

Heart failure with preserved Left Ventricular Ejection fraction (LVEF more than 50%, HFpEF) is an enormous clinical problem that accounts for almost half of all heart failure cases. It is becoming more prevalent in our society due to an aging population and increased prevalence of comorbid conditions such as diabetes, obesity, hypertension, and chronic kidney disease.

There has been a paucity of effective treatments for HFpEF with previous clinical trials involving ACE Inhibitors, Angiotensin Receptor Blockers, and beta blockers having failed to show any substantial clinical benefit. That is now changing with the advent of SGLT2 inhibitors such as empagliflozin.[1] Empagliflozin has the potential to help meet an enormous clinical need that currently exists in the treatment of patients with HFpEF. Given its existing benefit in diabetes, chronic kidney disease and now a broad population of heart failure patients, it is increasingly becoming a drug that will be indispensable to Cardiologists and General Practitioners alike in the future.

Dr Fiona Foo provides updates on the clinical management of heart failure with preserved and mid-range LV ejection fraction. Dr Martin Brown, a heart failure specialist, provides a valuable article with updates on the diagnosis and management of pulmonary hypertension.

In this issue

Access past issues

Click here to access past issues of GP Connect.

In other exciting news, our Sydney Cardiology CBD clinic location has moved a few doors down. We are still providing the same cardiac expertise, conveniently located near Wynyard station. The clinic can still be contacted by the current CBD clinic number and is operational now.

I hope you enjoy this edition of GP Connect. We remain available as always to provide continued care to you and your patients in any way possible.

Thank you for your continued support,

Dr Gunjan Aggarwal

References: 1. Anker et al. Empagliflozin in Heart Failure with a Preserved Ejection Fraction. N Engl J Med August 27, 2021.

Heart failure: brief update on HFpEF

Dr Fiona Foo

Specialising in general and interventional cardiology with an interest in heart disease affecting women and sports cardiology.

What is HFpEF?

HFpEF is a clinical syndrome in which patients have symptoms and signs of heart failure, a normal or near-normal left ventricular ejection fraction (LVEF>50%), and evidence of cardiac dysfunction as a cause of symptoms (e.g., abnormal left ventricular filling and elevated filling pressures)[1]

The universal definition of Heart Failure (HF) classifies the different phenotypes according to LVEF:[2]

LVEF ≤ 40%
HF with reduced EF (HFrEF)
LVEF 41-49%
HF with mildly reduced EF (HFmrEF)
LVEF ≥ 50 %
HF with preserved EF (HFpEF)

HF is a clinical syndrome with symptoms and/or signs caused by a structural and/or functional cardiac abnormality and corroborated by elevated natriuretic peptide levels and/or objective evidence of pulmonary or systemic congestion.[2]

Diagnosis of HFpEF:

1. Symptoms and signs of heart failure.
2. LVEF ≥50%.*
3. Objective evidence of cardiac structural and/or functional abnormalities consistent with the presence of LV diastolic dysfunction/raised LV filling pressures, including raised natriuretic peptides.[3]

Risk Factors for developing HFpEF include advanced age, hypertension, obesity, and atrial fibrillation (AF). HFpEF is twice as common in women than men.

Prognosis

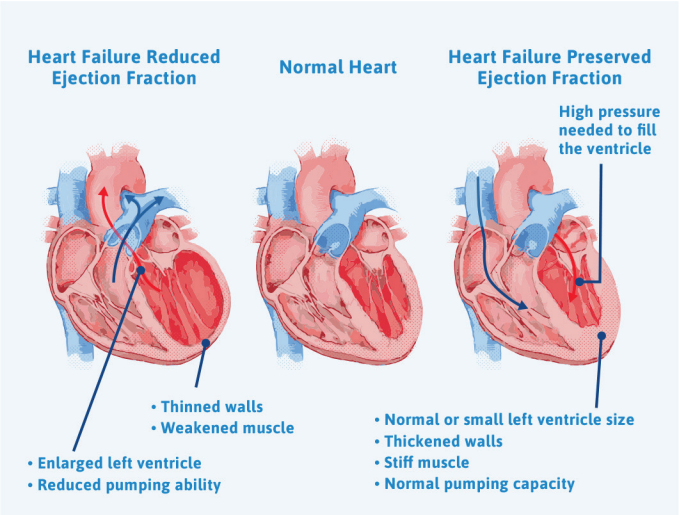
Patients with HFpEF experience an increased risk of cardiovascular (CV) death. 5-year mortality is 76% among first-hospitalised patients.[4] 90-day rehospitalisation rate is 30%.[5]

Treatment of HFpEF

Until recently there, no treatment has been shown to convincingly reduce mortality and morbidity in patients with HFpEF.

Recommendations for the treatment of HFpEF include:

- Screening for, and treatment of, aetiologies and cardiovascular and non-cardiovascular comorbidities e.g., systolic/diastolic hypertension; rate control in AF.
- Diuretics are recommended in congested patients with HFpEF to alleviate symptoms and signs. Consider a mineralocorticoid receptor antagonist (e.g., Spironolactone) in patients with HFpEF.



Heart failure: brief update on HFpEF

New recommendation to treat heart failure with preserved ejection fraction (LVEF ≥50%).[6]

- An SGLT2 inhibitor (empagliflozin) should be considered in patients with HFpEF to decrease cardiovascular mortality or hospitalisation for heart failure (strong recommendation for use; moderate quality of evidence).[6]

Emperor Preserved Study outcomes support the use of empagliflozin in HFpEF patients to reduce the risk of CV death and heart failure hospitalisation. The study assigned nearly 6,000 patients with class II-IV HF and an EF of > 40% to receive empagliflozin (10mg od) or placebo in addition to usual therapy. There was a significant reduction in the primary endpoint - combined risk of cardiovascular death or first hospitalisation for heart failure, mainly driven by a lower risk of hospitalisation for heart failure in the empagliflozin group. RRR 21%, ARR 3.3%, NNT=31; There was a non-significant 9% RRR in CV mortality. There was also a two times slower decline in kidney function in patients on empagliflozin. There is also a favourable effect of empagliflozin on QoL.[7]

New recommendations to treat heart failure with mildly reduced ejection fraction (LVEF 41–49%)[6]

- Either an ACE inhibitor, ARNI (sacubitril–valsartan), or ARB may be considered in patients with HFmrEF to decrease cardiovascular mortality or hospitalisation for heart failure (weak recommendation for; low quality of evidence).[6]
- An SGLT2 inhibitor (empagliflozin) should be considered in patients with HFmrEF to decrease cardiovascular mortality or hospitalisation for heart failure (strong recommendation for; moderate quality of evidence).[6]
- In patients with HFmrEF associated with persistent symptoms despite optimised therapy, if the patient is iron deficient (i.e., ferritin <100 mg/L, or ferritin 100–299 mg/L with transferrin saturation <20%), intravenous iron (ferric carboxymaltose) may be considered to improve symptoms and quality of life and decrease hospitalisation for heart failure (weak recommendation for; low quality of evidence).[6]

Summary

SGLT2 empagliflozin is now indicated in all patients, regardless of LVEF, to reduce CV death and heart failure hospitalisations. It is not available on the PBS for patients with LVEF >40% but can be accessed via a company-sponsored patient access program.

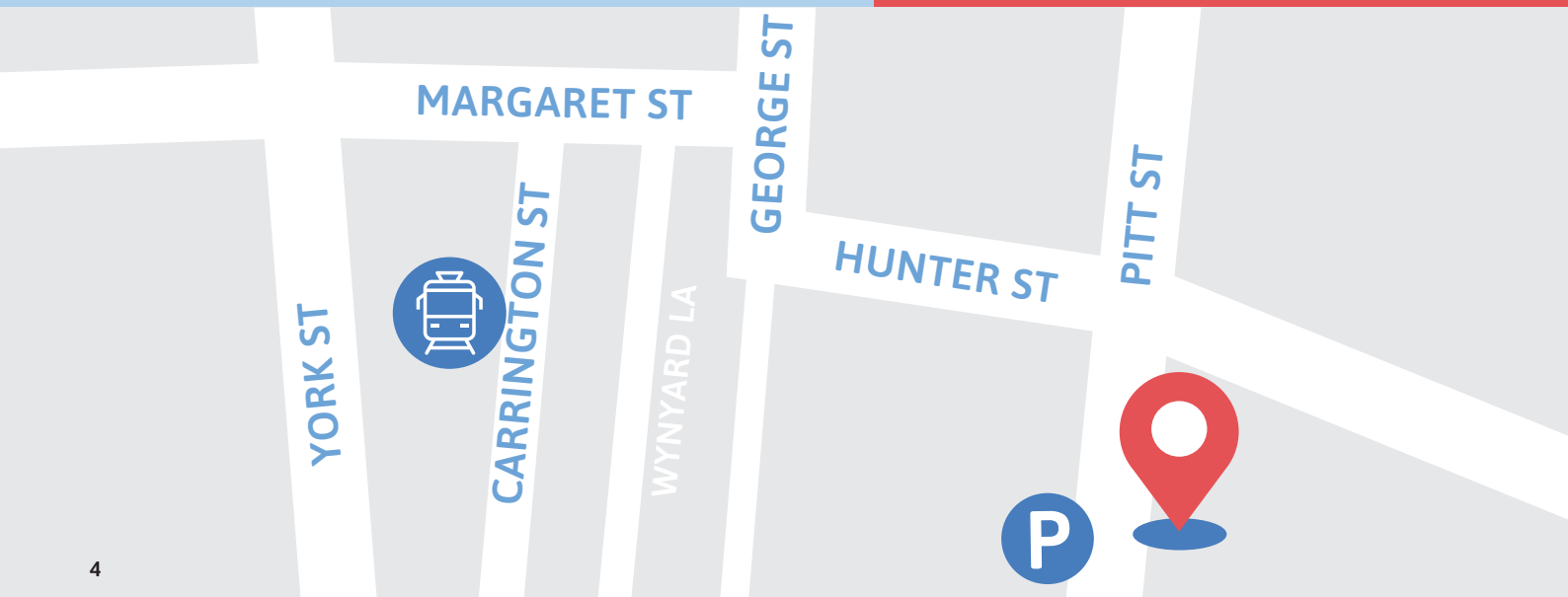
References: 1. Ponikowski P, Voors AA, Anker SD, Bueno H, Cleland JGF, Coats AJS, et al. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: The Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC) Developed with the special contribution of the Heart Failure Association (HFA) of the ESC. Eur Heart J 2016; 37: 2129– 2200, doi: 10.1093/eurheartj/ehw128. 2. Bozhurt B et al. Eur J Heart Fail. 2021;23:352 3. McDonagh TA et al. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure: Developed by the Task Force for the diagnosis and treatment of acute and chronic heart failure of the European Society of Cardiology (ESC). European Heart Journal, Volume 42, Issue 36, 21 September 2021, Pages 3599–3726, https://doi.org/10.1093/eurheartj/ehab368 4. Shah KS et al. J Am Coll Cardiol 2017; 70:2476-86. 5. Khan MS et al. Circ Heart Fail 2021; 14 (4) e008335 6. Sindone, A. P., De Pasquale, C., Amerena, J., Burdeniuk, C., Chan, A., Coats, A., Atherton, J. J. (2022). Consensus statement on the current pharmacological prevention and management of heart failure. Medical Journal of Australia, 217(4), 212–217. https://doi.org/10.5694/mja2.51656 7. Anker SD, Butler J, Filippatos G et al. EMPEROR-Preserved Trial Investigators. Empagliflozin in Heart Failure with a Preserved Ejection Fraction. N Engl J Med 2021. doi:10.1056/NEJMoa2107038.

Sydney Cardiology

Our city location has moved!

- Experience the same cardiac expertise
- Located near Wynyard Station
- Easily contacted on the same number 02 9422 6080

LEVEL 13,
68 PITT STREET



Our team

We have experienced cardiologists in all major sub-specialties to provide the highest quality of patient care. We also have specialists in related fields including endocrinology and respiratory medicine. Our Sydney Cardiology team includes:

Cardiology

Dr James Wong

Specialising in general cardiology, prevention of coronary artery disease and hypertension.

Dr Gunjan Aggarwal

Specialising in general adult cardiology and non-invasive cardiac imaging, particularly echocardiography and cardiac CT.

Dr Ru-Dee Ting

Specialising in general and interventional cardiology, including cardiac haemodynamic studies and complex coronary intervention.

Dr Bill Petrellis

Specialising in general adult cardiology and electrophysiology, including atrial fibrillation and device implantation.

Dr Abhinav Luhach

Specialising in general adult cardiology, cardiac CT, and preventive cardiology.

Dr Andrew Terluk

Specialising in general cardiology with an interest in cardiomyopathy in the setting of cancer.

Dr Fiona Foo

Specialising in general and interventional cardiology with an interest in heart disease affecting women and sports cardiology.

A/Prof Martin Brown

Specialising in advanced heart failure, pulmonary hypertension, and transplant cardiology.

Endocrinology

Dr Suja Padmanabhan

Specialising in diabetes and general endocrinology with a special interest in diabetes in pregnancy and women's health.

Respiratory Medicine

Dr Tracy Smith

Respiratory and sleep physician specialising in respiratory disease with a special interest in respiratory failure due to lung or heart disease.

Pulmonary Hypertension: a brief overview

A/Prof Martin Brown

Specialising in advanced heart failure, pulmonary hypertension, and transplant cardiology

Introduction.

Pulmonary Hypertension (PH) is the presence of elevated pressures within the blood vessels of the lungs (Figure 1). PH can be further separated into precapillary (right sided, arterial, PAH) and post capillary (left sided, venous, PVH) (Figure 2).

Pulmonary Arterial Hypertension (PAH) is a rare disease, estimated to affect 15 cases/100 000 population (3 800 Australians) and can present at any age.[1] Approximately 65-80% of patients with PH will have left-sided disease or Pulmonary Venous Hypertension (PVH), e.g., heart failure with preserved ejection fraction (HFPEF), mitral valve or aortic valve disease.

Exertional breathlessness and fatigue are the most common symptoms for which medical attention is initially sought. The presentation of such non-specific symptoms often contributes to the delay in diagnosis. In Australia, patients reported an average five general practitioner visits, three specialist reviews, and a delay of nearly four years from symptom onset to a diagnosis of Idiopathic Pulmonary Arterial Hypertension (iPAH).[2]

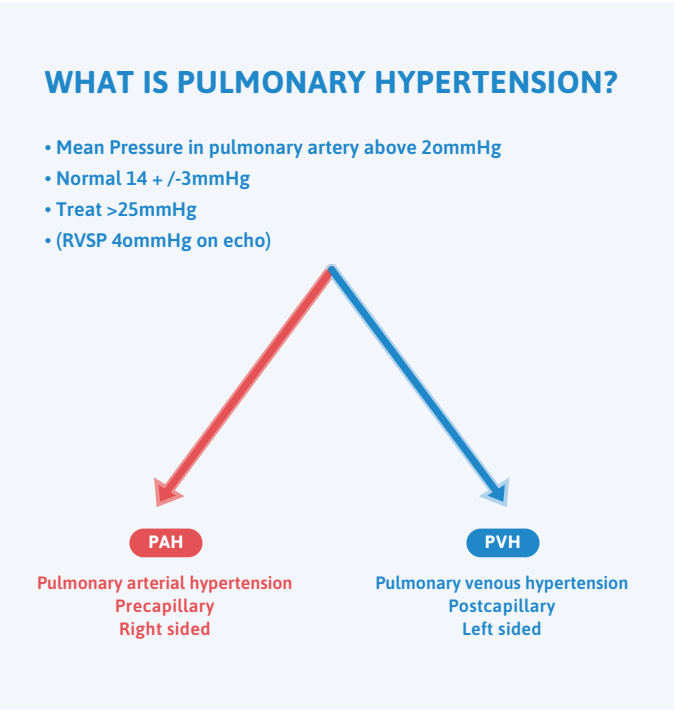


Figure 2. Pre-capillary pulmonary hypertension versus post-capillary pulmonary hypertension

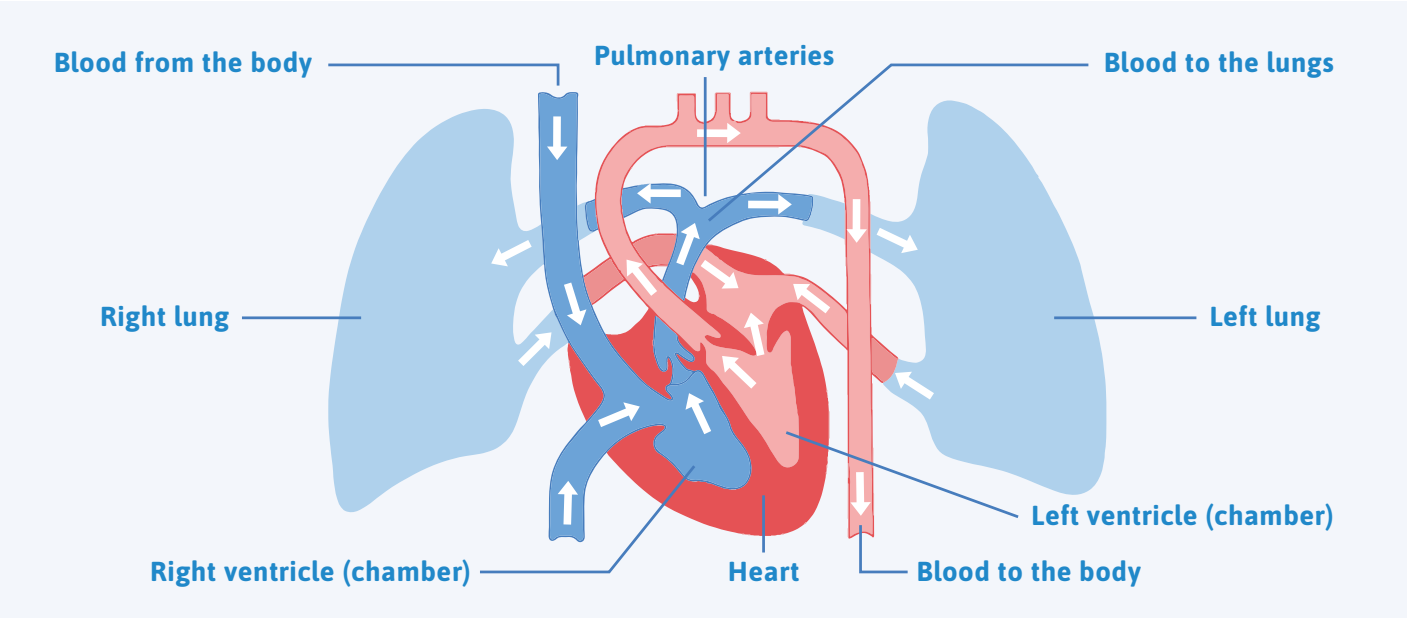


Figure 1. Cardiac and pulmonary anatomy

Pulmonary Hypertension: a brief overview

Risk factors include being female (although males have longer delay to diagnosis), connective tissue disorders, positive family history, use of diet pills, sleep apnoea, pulmonary fibrosis, emphysema, thromboembolic disease, and heart failure.

Symptoms of PH

Exertional breathlessness and fatigue are the most common symptoms but patients can present with right heart failure and often associated tricuspid regurgitation (pedal oedema, ascites, hepatomegaly, anorexia, early satiety, weight loss, abnormal liver function tests, headaches). Signs may include right ventricular heave, loud second heart sound, elevated JVP, systolic or diastolic murmurs, hepatomegaly or pulastile liver, pitting oedema, ascites, pleural effusions, cyanosis, varicose veins) (Figure 3)[3]

Occasionally patients can present with chest pain due pulmonary emboli or right ventricular ischaemia.

Patients may have symptoms or signs of connective tissue disease (telangiectasia, scleroderma, Raynauds) or signs of COPD, fibrotic crackles, obesity. Patients with chronic emboli may have signs of chronic lower limb venous insufficiency or DVTs but a significant proportion have no discernable history of thromboembolism.

Sarcoid patients may have a history of uveoparotid fever or uveitis, erythema nodosum (painful red lumps on lower limbs), lymphadenopathy, arthritis, purple facial lesions (lupus pernio).

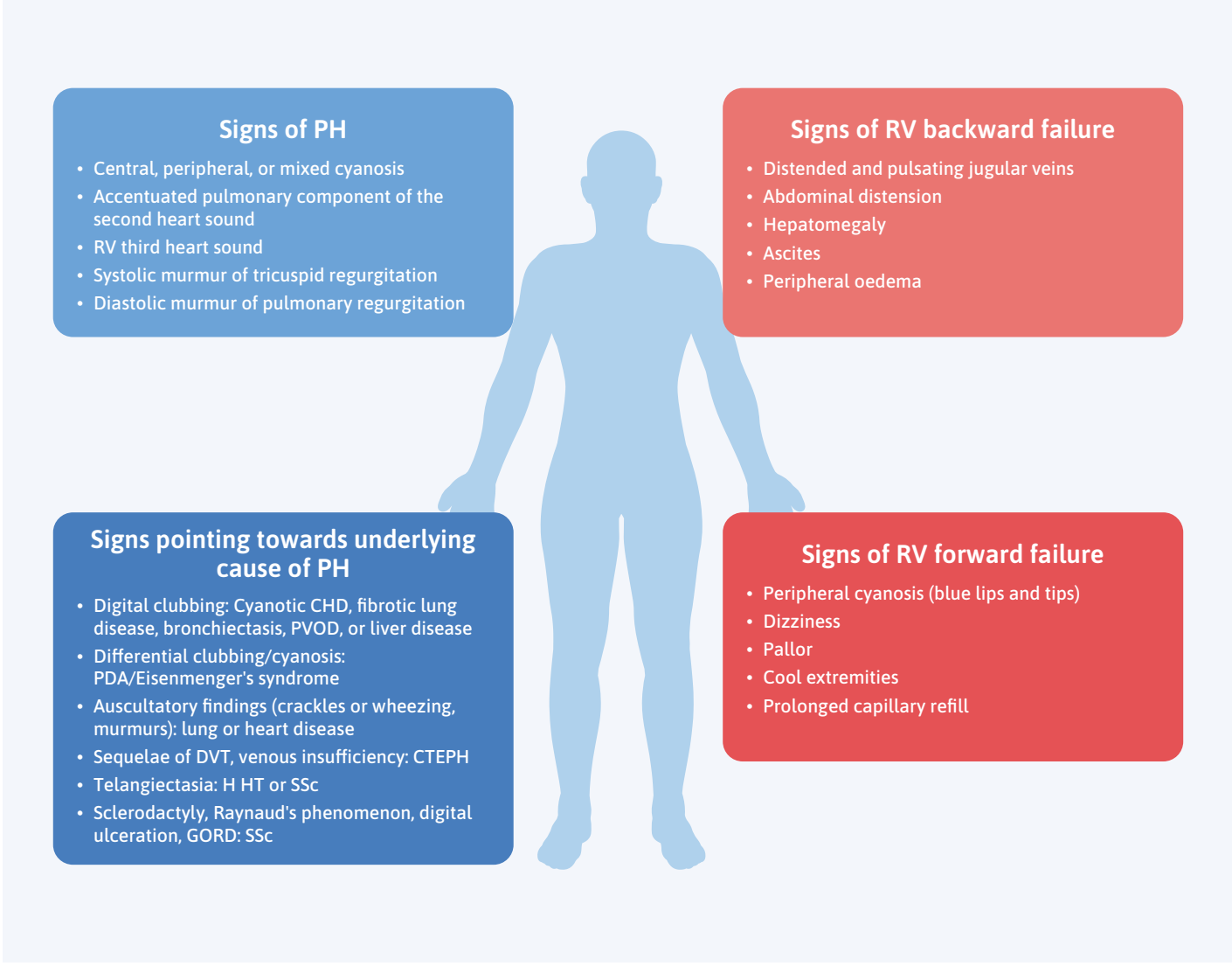


Figure 3. Signs of Pulmonary Hypertension

Pulmonary Hypertension: a brief overview

Investigations

Investigations are based around determining the specific Group or cause and include:

1. Blood tests – Renal and hepatic function, thyroid function, full blood count, iron, autoimmune screen (ANA, ENA, ANCA, dsDNA, myositis, C3/C4, RhF, Lupus anticoagulant), NT proBNP plus ACE, calcium and 1,25 Vitamin D for sarcoid screening.
2. ECG – rhythm, RA enlargement (P pulmonale), Righ axis deviation, RV hypertrophy, RBBB, RV strain, prolonged QT interval.
3. Chest Xray – hilar lymphadenopathy, pulmonary vascular pruning, pleural effusions, RV enlargement, pulmonary fibrosis, COPD.
4. Transthoracic echocardiogram – RV size and function, tricuspid regurgitation, right ventricular systolic pressure or RVSP (from tricuspid reguritant velocity), pulmonary artery diameter, LV systolic and diastolic function, mitral/ aortic/ pulmonary valve function, pulmonary artery acceleration time, IVC diameter and collapse, pericardial effusion, RA size.
5. High resolution CT chest – excludes primary lung disease and determies PA diameter
6. CT pulmonary angiogram (CTPA) and V/Q scan – CTPA will miss peripheral emboli in 5% cases as only has resolution to detect segmental and subsegmental PE, so we recommend to perform both unless severe lung disease is present. A CTPA helps to determine if occlusions are amenable to surgical or percutaneous intervention.
7. Sleep study and /or overnight oximetry.
8. 6 minute walk test – distance walked (percent predicted) and oxygen desaturation.
9. Cardiopulmonary exercise test (CPET) – determines lung and heart capacity during exercise and ability to expire carbon dioxide (reduced in PAH).
10. Right heart catheter +/- exercise, saline or vasodilator challenge. Definitive diagnosis is determined by right heart catheterisation (RHC), generally performed via the right neck (internal jugular), elbow (basilic) or groin (femoral) vein, to directly assess blood pressures in the heart and lung. Sometimes a vasodilator challenge to assess reactivity of pulmonary vessels and/or fluid challenge to assess for a stiff heart may be performed at the time of right heart catheterisation. An exercise bike may be used during the procedure to simulate exertion.
11. Invasive pulmonary angiogram – gold standard for chronic pulmonary emboli and suitability for surgery or balloon pulmonary angioplasty.

Definition

Pulmonary hypertension is defined by right heart catheterisation into pre-capillary, post-capillary and combined pre and post capillary PH. A new category of exercise PH was introduced in August 2022 using the mPAP and cardiac output measurements (CO)(Table 1). The mean pulmonary artery pressure (mPAP) has to be greater than 20mmHg for PH to be present. Left or right sided disease is then determined by the left ventricular end diastolic pressure which is measured indirectly by the balloon pulmonary artery wedge or occlusion pressure (PAWP or PAOP). If this is normal and the calculated pulmonary vascular resistence (PVR) greater than 2 Woods Units, then it is right sided. If the PAOP is elevated then PH can be left sided or combined, depending on the PVR. A PVR < 2 Woods Units means no right sided disease co-exists.[3]

Table 1. Haemodynamic definitions of PHT

Definition	Haemodynamic characteristics
PH	mPAP >20 mmHg
Pre-capillary PH	mPAP >20 mmHg PAWP ≤15 mmHg PVR >2 WU
Post-capillary PH	mPAP >20 mmHg PAWP >15 mmHg PVR ≤2 WU
Combined pre and post capillary PH	mPAP >20 mmHg PAWP >15 mmHg PVR >2 WU
Exercise PH	mPAP/CO slope between rest and exercise >3 mmHg/L/min

Pulmonary Hypertension: a brief overview

Classification

Pulmonary hypertension is classified into 5 treatment groups depending on the pathology (Table 2). This determines the appropriate treatment strategy as it is different for each group. Group 1 is due to pulmonary arteriole constriction and narrowing with endothelial and smooth cell proliferation and includes idiopathic, hereditary, drug induced (Table 3), autoimmune, HIV, portopulmonary secondary to liver cirrhosis, congenital heart disease and pulmonary venous occlusion disease (PVOD). Group 2 is secondary to elevated left heart pressures resulting in back pressure to the pulmonary vascular bed, such as systolic and diastolic heart failure and valvular disease. Group 3 is due to lung diseases which directly damage the pulmonary vessels, such as pulmonary fibrosis and COPD or chronic hypoxia resulting in pulmonary vasoconstriction such as sleep apnoea or Obesity Hypoventilation Syndrome. Group 4 is secondary to chronic pulmonary emboli and vascular obstruction. Group 5 is miscellaneous and includes haematological disorders or malignancies, thyroxicosis and pulmonary sarcoid.

Table 2. Group Classification of PHT

GROUP 1 PAH	
1.1	Idiopathic PAH
1.2	Heritable PAH
1.3	Drug-and toxin-induced PAH
1.4	PAH associated with:
1.4.1	Connective tissue disease
1.4.2	HIV infection
1.4.3	Portal hypertension
1.4.4	Congenital heart disease
1.4.5	Schistosomiasis
1.5	PAH long-term responders to calcium channel blockers
1.6	PAH with overt features of venous/capillaries (PVOO/PCH) involvement
1. 7	Persistent PH of the newborn syndrome

GROUP 2 PH DUE TO LEFT HEART DISEASE	
2.1	PH due to heart failure with preserved LVEF
2.2	PH due to heart failure with reduced LVEF
2.3	Valvular heart disease
2.4	Congenital/acquired cardiovascular conditions leading to post-capillary PH

GROUP 3 PH due to lung diseases and/or hypoxia	
3.1	Obstructive lung disease
3.2	Restrictive lung disease
3.3	Other lung disease with mixed restrictive/ obstructive pattern
3.4	Hypoxia without lung disease
3.5	Developmental lung disorders

GROUP 4 PH due to pulmonary artery obstructions	
4.1	Chronic thromboembolic PH
4.2	Other pulmonary artery obstructions

GROUP 5 PH with unclear and/or multifactorial mechanisms	
5.1	Haematological disorders
5.2	Systemic and metabolic disorders
5.3	Others
5.4	Complex congenital heart disease

Table 3. Drugs associated with pulmonary hypertension

Drugs and toxins associated with pulmonary arterial hypertension	
Definite association	**Possible association**
Aminorex Benfluorex Dasatinib Dexfenfluramine Fenfluramine Methamphetamines Toxic rapeseed oil	Alkylating agents (cyclophosphamide, mitomycin C)[a] Amphetamines Bosutinib Cocaine Diazoxide Direct-acting antiviral agents against hepatitis C virus (sofosbuvir) Indirubin (Chinese herb Qing-Dai) Interferon alpha and beta Leflunomide L-tryptophan Phenylpropanolamine Ponatinib Selective proteasome inhibitors (carfilzomib) Solvents (trichloroethylene)[a] St John's Wort

Treatment

Lifestyle

General measures for treatment of PAH include structured physical activity and lifestyle measures such as salt reduction, fluid management, daily weights, smoking cessation, alcohol reduction, avoidance of amphetamines or weight loss medications.

Pregnancy with this condition can be high risk to the mother and foetus and so contraception is recommended.

Infection prevention is advised with annual influenza vaccines, COVID vaccination and 5 yearly pneumonia vaccines.

Oxygen therapy may be required at home or during airplane flights, especially if oxygen saturation at rest is <92%.

Anticoagulation for CTEPH is usually required. Currently, only warfarin is indicated for this condition.

Group directed therapy

PAH (Group 1) is characterised by increased levels of endothelin and decreased levels of prostacyclin and nitric oxide. As a result, three pathways are the focus of current medical treatment options for PAH (Figure 4)[4]:

1. Endothelin receptor antagonists (ERA) such as ambrisentan , macitentan or bosentan.
2. Nitric oxide donors such as phosphodiesterase (PDE)-5 inhibitors (sildenafil and tadalafil) or soluable guanlylate cyclase stimulators (riociguat)
3. Prostanoids such as inhaled iloprost, intravenous epoprostanol, oral treprostenil or Prostacyclin receptor agonists (eg Selexipag).
4. Calcium channel blockers (eg diltiazem) may be used if there is evidence of vasoreactivity during right heart catheterisation.

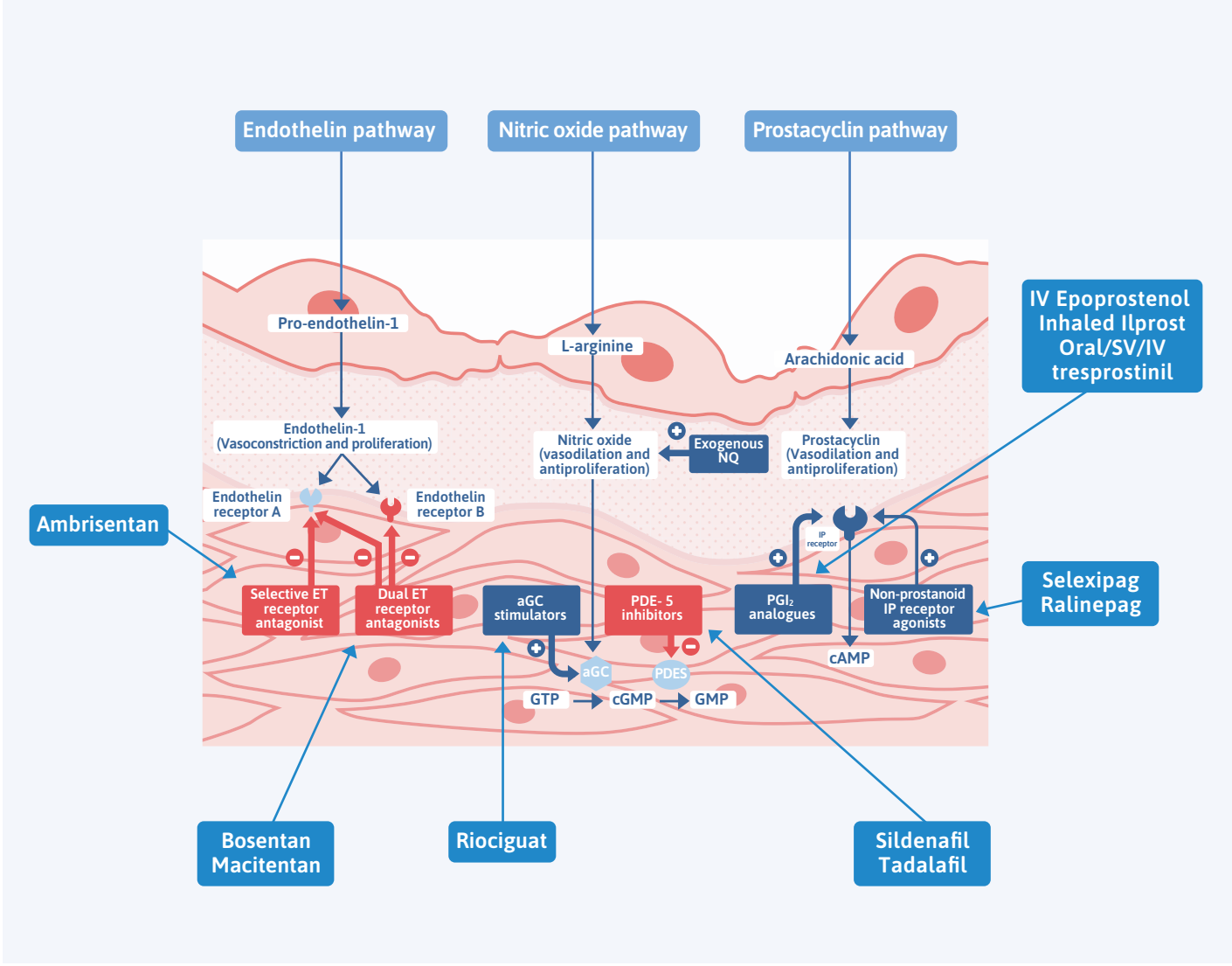


Figure 4. Drug targets for Group 1 PAH – Adapted from Humbert NEJM[4]

Pulmonary Hypertension: a brief overview

Group 1 PAH have the best response to medical therapy but will often require dual or triple therapy (see risk assessment).

Each treatment option is currently reimbursed on the pharmaceutical benefits scheme (PBS) if the there is significant breathlessness (NYHA II,III,IV). Applications to the government for medication scripts may take 2-3 weeks to be approved and need to be reassessed and renewed every 6months.

These medications are very expensive and can only be prescribed via a recognised PAH prescribing clinician.

Group 2 or left sided (pulmonary venous hypertension) treatment is less well established and centres around fluid management (diuretics) and correction of valvular disorders with treatment of systolic or diastolic dysfunction. Occassionallly sildenafil may be of benefit.

Group 3 PAH does not respond to conventional pulmonary hypertension specific therapies but oxygen and CPAP (if indicated) will often be prescribed. Occasionally, Sildenafil will be trialled for 3 months but is not listed on the PBS for this indication, so needs to be self funded (approx. $80 per month).

Group 4 PAH (CTEPH) is the only type of PH that may be cured surgically (with open pulmonary thrombo-endarterectomy) or with interventional balloon angioplasty. Riociguat or endothelin antagonists may be used if surgery is not an option or if there is an inadequate response to surgery. Warfarin is currently the only indicated anticoagulant for this disease.

Group 5 currently has no approved PAH - specific therapies but occasionaly is treated as for Group 1.

Table 4. 3-tier comprehensive risk assessment with associated 1-year mortality

Comprehensive risk assessment			
Determinants of prognosis (estimated 1-year mortality)	**Low risk (<5%)**	**Intermediate risk (5–20%)**	**High risk (>20%)**
Clinical observations and modifiable variables			
Signs of right HF	Absent	Absent	Present
Progression of symptoms and clinical manifestations	No	Slow	Rapid
Syncope	No	Occasional syncope	Repeated syncope
WHO-FC	I, II	III	IV
6MWD	>440 m	165–440 m	<165 m
CPET	Peak VO^2 >15 mL/min/kg (>65% pred.) VE/VCO^2 slope <36	Peak VO^2 11–15 mL/min/kg (35–65% pred.) VE/VCO^2 slope 36–44	Peak VO^2 <11 mL/min/kg (<35% pred.) VE/VCO^2 slope >44
Biomarkers: BNP or NT -proBNP	BNP <50 ng/L NT-proBNP <300 ng/L	BNP 50–800 ng/L NT-proBNP 300–1100 ng/L	BNP >800 ng/L NT-proBNP >1100 ng/L
Echocardiography	RA area <18 cm^2 TAPSE/ sPAP >0.32 mm/mmHg No pericardial effusion	RA area 18–26 cm^2 TAPSE/ sPAP 0.19 – 0.32 mm/mmHg Minimal pericardial effusion	RA area >26 cm^2 TAPSE/sPAP <0.19 mm/mmHg Moderate or large pericardial effusion
cMRI	RVEF >54% SVI >40 mL/m^2 RVESVI <42 mL/m^2	RVEF 37–54% SVI 26–40 mL/m^2 RVESVI 42–54 mL/m^2	RVEF <37% SVI <26 mL/m^2 RVESVI >54 mL/m^2
Haemodynamics	RAP <8 mmHg CI ≥2.5 $L/min/m^2$ SVI >38 mL/m^2 SvO^2 >65%	RAP 8–14 mmHg CI 2.0–2.4 $L/min/m^2$ SVI 31–38 mL/m^2 SvO2 60–65%	RAP >14 mmHg CI <2.0 $L/min/m^2$ SVI <31 mL/m^2 SvO2 <60%

Group 1: Risk Assessment

Group 1 patients treatment regime depends on their risk assessment with higher risk patients requiring triple therapy or referral to a lung transplant unit3. 1 year mortality is predicted by the 3-strata comprehensive risk assessment (Table 4) and treatment goals are aimed at achieving low risk status. 1 year mortality for low risk is <5%, intermediate risk 5-20% and high risk >20%. A more simplified four-strata risk assessment tool can be used in clinical practice (Table 5).

Table 5. Simplified 4 tier risk assessment

Determinants of prognosis	Low risk	Intermediate - low risk	Intermediate - high risk	High risk
Points assigned	1	2	3	4
WHO-FC	I or II	-	III	IV
6MWD, m	>440	320–440	165–319	<165
BNP or NT-proBNP, ng/L	<50 <300	50–199 300–649	200–800 650–1100	>800 >1100

The European Society of Cardiology updated it's treatment algorithm in late 2022 to include these regular risk assessments (Figure 5 light blue boxes)[3].

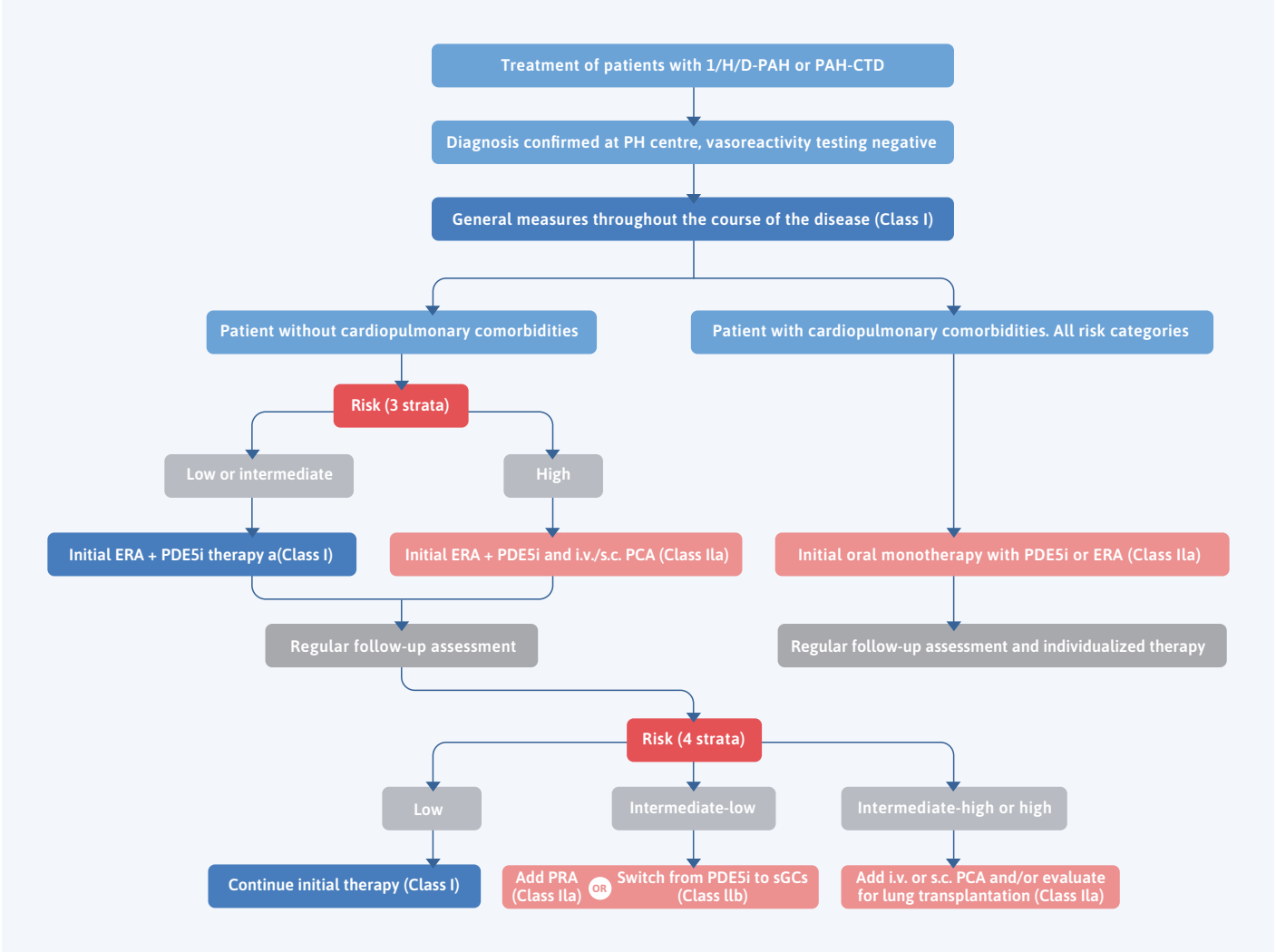


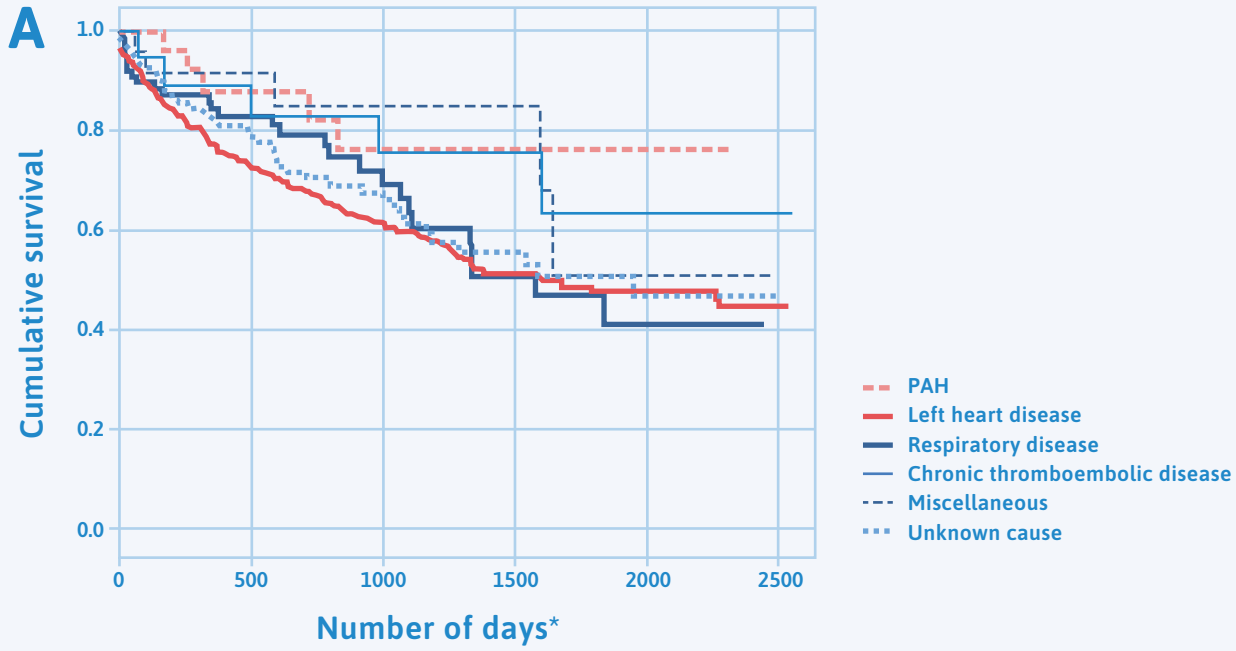
Figure 5. Treatement algorithm based on risk assessment

Prognosis

In an Australian study based on transthoracic echocardiography determined pulmonary hypertension by Strange et al published in 2021,[1] mean survival (ie 50%) for patients with 'all-cause' PHT (eRVSP >40 mm Hg) was 4.3±0.1 years from first recorded echocardiogram (Figure 6A).

Patients with pulmonary hypertension caused by respiratory disease, left heart disease and unknown cause had a worse prognosis (mean survival 4.1 to 4.3 years).

By contrast, patients with Group 1 PAH (majority on treatment), had the best survival (approx 82% at 4.3 years). A higher pulmonary pressure on echocardiogram was associated with a poorer prognosis (Figure 6B).



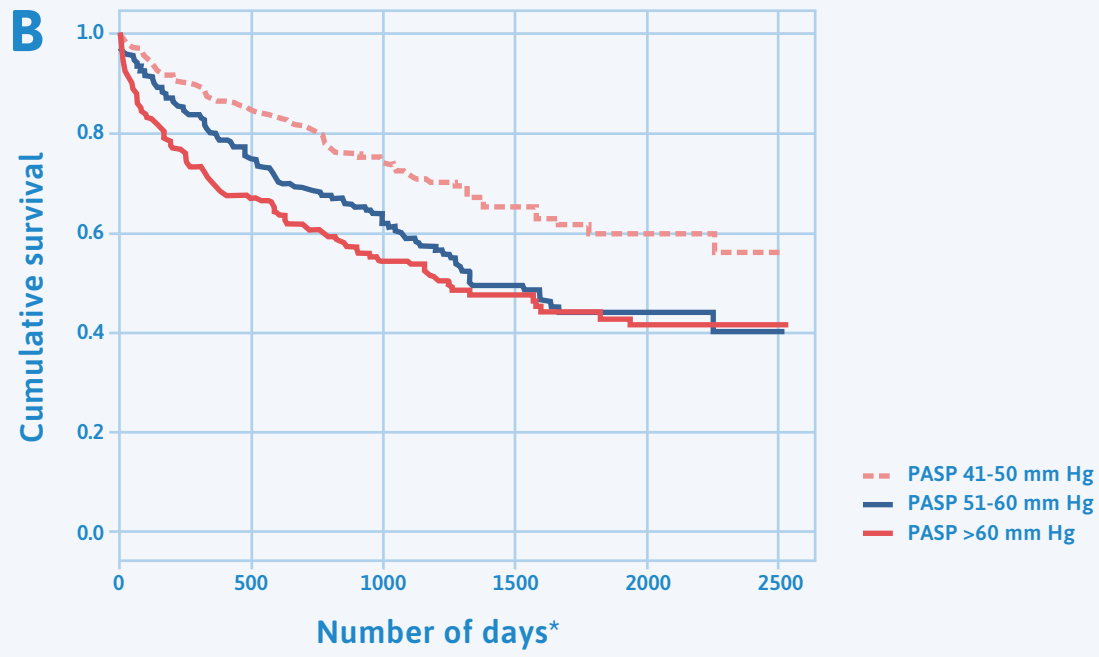


Figure 6. Survival based on Group of PHT (A) and Pulmonary Artery Systolic Pressure (PASP) from transthoracic echo (TTE) assessment. *NOTE: right heart catheter measures MEAN pulmonary artery pressure whereas TTE measures PEAK pulmonary artery pressure.*

Pulmonary Hypertension: a brief overview

Future of treatment

Treatments in development are based around either new modes of delivery of currently used therapies (eg inhaled treprostenil and soluable guanine cyclase inhibitors similar to Riociguat), modified existing agents with increased receptor binding and reduced frequency of dosing or targeted at new mechanistic pathways.

Ralinepag

Ralinepag is an orally available prostacyclin receptor agonist with higher receptor affininity and longer half life than selexipag. It is currently in Phase III trials being run at Macqaurie University Hospital.

Sotatercept

Sotatercept—a fusion protein comprising the extracellular domain of the human activin receptor type IIA linked to the Fc domain of human immunoglobulin G1—acts on the transforming growth factor (TGF)-ß superfamily, restricting growth-promoting and activating growth-inhibiting pathways. Trials have shown sotatercept reduces PVR with improvements in 6MWD and NT-proBNP.[3]

Conclusion

Pulmonary hypertension presents with vague symptoms of dyspnoea and fatigue with an average delay in diagnosis of 3.9 years, and should be a differential in any patient with unexplained dyspnoea. It can be due to multiple aetiologies but the majority of patients will have left sided disease. Treatment regimes are based around diagnosing the cause or Group with precapillary Group 1 and 4 pulmonary arterial hypertension having the most specific therapies. It remains an incurable condition with a high mortality rate and early referral to a PH specialist or Expert Referral Centres is recommended.[5-6]

References: 1. Pulmonary hypertension: prevalence and mortality in the Armadale echocardiography cohort. Strange G, Playford D, Stewart S, et al. Heart 2012;98:1805-1811. 2. 2022 ESC/ERS Guidelines for the diagnosis and treatment of pulmonary hypertension: Developed by the task force for the diagnosis and treatment of pulmonary hypertension of the European Society of Cardiology (ESC) and the European Respiratory Society (ERS). Endorsed by the International Society for Heart and Lung Transplantation (ISHLT) and the European Reference Network on rare respiratory diseases (ERN-LUNG). Marc Humbert et al. European Heart Journal, Volume 43, Issue 38, 7 October 2022, Pages 3618–3731, https://doi.org/10.1093/eurheartj/ehac237 3. Time from Symptoms to Definitive Diagnosis of Idiopathic Pulmonary Arterial Hypertension: The Delay Study. Geoff Strange, Eli Gabbay, Fiona Kermeen, Trevor Williams, Melinda Carrington, Simon Stewart, Anne Keogh. Pulmonary Circulation, Volume 3, Issue 1, January 2013, Pages 89-94 4. Treatment of Pulmonary Arterial Hypertension. Marc Humbert, Olivier Sitbon, Gérald Simonneau. September 30, 2004. N Engl J Med 2004; 351:1425-1436. DOI: 10.1056/NEJMra040291 5. Expert Referral Centres in Australia and NZ - PHSANZ www.phsanz.org 6. Home - Sydney PHT www.sydneypht.com.au

Our services

Sydney Cardiology is a world class comprehensive cardiology service, delivered with expertise and experience. Using state of the art diagnostic equipment in all five clinic locations, Sydney Cardiology strives to provide exemplary outcomes for long term patient care.

Urgent access

We provide same-day urgent appointments and 24/7 on-call support for GPs with a dedicated phone number, **02 9966 7700**.

Non-invasive testing

Including stress-echocardiography, echocardiography, holter monitor studies, ambulatory blood pressure studies, coronary calcium score, dobutamine stress echo, electrocardiogram and event monitor recording.

Echo, ABP, and holter monitor-only referral services

We provide echo-only, ABP-only, and holter monitor-only referral services, with a summary report on any adverse findings.

Electrophysiology

Including diagnostic electrophysiology studies, ablation of cardiac arrhythmias, cardiac device implantation, pacemakers and defibrillators, and follow up of implanted cardiac devices.

Cardiac procedures

Including coronary angiography, cardiac biopsies, right heart catheterisation, transesophageal echocardiogram and coronary angioplasty.

Including renal and lower limb angioplasty, ankle brachial index and SphygmoCorR central blood pressure testing.

ECG fax service

For urgent advice, 12-lead ECGs can be faxed to our locations.

Bella Vista - Fax: 02 9672 6214

Blacktown - Fax: 02 9676 8900

Chatswood - Fax: 02 9411 1904

Parramatta - Fax: 02 9635 1247

Sydney City - Fax: 02 9422 6081

Peripheral vascular services

Including renal and lower limb angioplasty, ankle brachial index and SphygmoCorR central blood pressure testing.

In-hospital care

All patients with appropriate private health coverage undergoing hospital procedures, do not incur any out-of-pocket costs. Sydney Cardiology has access to leading private hospitals, including:

Sydney Adventist Hospital
Wahroonga

Norwest Private Hospital
Bella Vista

Macquarie University Hospital
North Ryde

Northern Beach Hospital
Frenchs Forest

Patient fees

Sydney Cardiology is a private clinic however there are no out of pocket costs for Department of Veterans Affairs patients.

Referrals

To request a referral pad, click here

Clinic locations

All clinics have emergency appointment timeslots available for same-day referrals. Contact any of our clinics directly for more assistance.

Bella Vista

Suite 213, Q Central,
10 Norbrik Drive,
Bella Vista NSW 2153

Tel: 02 9422 6000 | Fax: 02 9672 6214

Blacktown

Suite 4,
15-17 Kildare Road,
Blacktown NSW 2148

Tel: 02 9422 6050 | Fax: 02 9676 8900

Chatswood

Suite 901, Level 9, Tower B,
799 Pacific Highway,
Chatswood NSW 2067

Tel: 02 9422 6040 | Fax: 02 9411 1904

Parramatta

Level 5 Suite 501, B1 Tower,
118 Church Street,
Parramatta NSW 2150

Tel: 02 9422 6060 | Fax: 02 9635 1247

Sydney City

Suite 13, Level 13
68 Pitt Street
Sydney NSW 2000

Tel: 02 9422 6080 | Fax: 02 9422 6081

Sydney Cardiology offers a free after-hours consult service for GPs
Call (02) 9966 7700 for specialist advice

Do you want to receive printed copies of GP Connect or other resources?

Click here to order copies of this newsletter and / or other available resources via our website.