

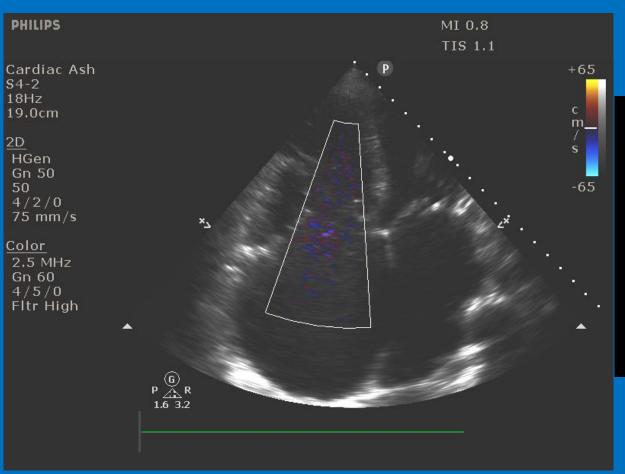
Ash Mukherjee MBBS, FRCS, FRCEM, FACEM, CFEU, CCPU

Consultant Emergency Physician



T- 39.6°C	SpO <sub>2</sub> - 88% RA	pH-7.30
HR-133	GCS-14	Lactate- 9.3
BP- 126/70	RR-30	ECG- AF

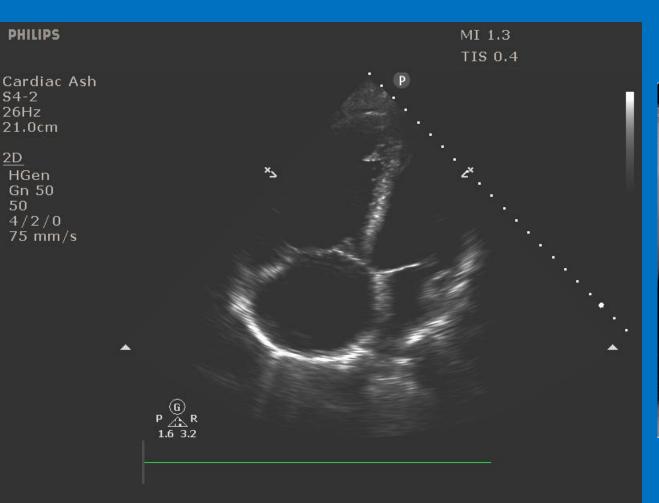






T- 38.4°C	SpO <sub>2</sub> - 84% RA	pH-7.28
HR-113	GCS-15	Lactate- 4.8
BP- 130/70	RR-30	ECG- S Tachy

64yr Febrile with ↑SOB and cough





# What is Pulmonary Hypertension (PH)?

Pulmonary hypertension (PH) is a rapidly progressive, deadly disease which affects the lungs and heart.<sup>1,2</sup>

It is characterized by high blood pressure in the arteries of the lungs.

There are 5 main types of PH which affect patients in different ways, all of which can lead to heart failure and death.<sup>3</sup>

# 5 types

#### What are the symptoms?

PH is a personal condition and symptoms vary in each individual, common symptoms may include:<sup>4</sup>

#### Breathlessness Blue lips Fatigue

Educating people to recognize the symptoms of PH could save lives

#### The impact of PH

50% of patients die within two years if not treated.5

50%

The death rate for pulmonary arterial hypertension (PAH), the most studied form of PH, is higher than both breast or colorectal cancers.<sup>6,7</sup>

PH can have a profound impact on many aspects of daily life such as having difficulty climbing stairs, walking short distances or simply getting dressed.<sup>5,9</sup> Pulmonary hypertension (PH) is defined by a mean pulmonary artery pressure ≥ 25 mm Hg at rest, measured during right heart catheterization.

# Time matters for people with PH

Diagnosis of PH takes approximately 2 years due to delay.10

 Symptoms are often non-specific, meaning PH is frequently mistaken for asthma or other conditions.

**2** years

H is a rapidly progressive disease and plact in its progressive cannot be entirely regained. 11,12,13

# With earlier diagnosis

and treatment, survival and quality of life could be significantly improved.

Rapidly progressive disease

#### Who is affected?

It is thought that there are more than 25 million patients globally.14

# 25 million

One of the rare types of PH, called PAH, affects approximately 52 people per million. 15

People of all ages, including children, can develop PH although it is most likely to be diagnosed in people between 40-50 years of age.<sup>5</sup>

40-50 years

#### **Treatment**

A range of pharmaceutical treatments are available but they only treat 1 of the 5 types of PH, called PAH.

T currently

#### 0 cures for 4 of the 5 forms of PH

The only potentially curative treatment avanching surgery for 1 form of PH called chronic thromboembolic pulmonary hypertension (CTEPH).

Some patients are eligible for lung or heartlung transplant, although this is not always possible due to lack of available organs, or patients not being suitable for surgery.

Accurate and early diagnosis and treatment followed by continuous treatment monitoring can mean the difference between life and death.

More research is needed to improve understanding of how all 5 types can be treated effectively.<sup>10</sup>

#### References

 Resolvers S. Pulmoney Ingestention counset diagnosis and treatment. Clin Res Ce 6:227-641 (2007).
 Archie, April A mate-endysis of trials of pulmoney hypertension: A dirical conditions. Locking or plays and research methodology. Am Heart J 2007; 153: 1027-47.

. McL. Him, Wer al. ACCRIAHA 2009 expert consensus document on p. sperter. in. J Am Coll Central 2009 28:53(17):1573-619.

Benied J. Rulmanary Hypertension. Circulation 2002;105 p192-p194 Public Up4PH website, About PH. Available from http://www.publen.pd.ph.com pb///scoresect August 2011

Composition August 2011

Composition of Baseline Characteristics and Survival between 19 (department of Survival between 19 (department of Composition Texas Obsesse-related Pulmoney Antenial Pypertension of Lung Transplant 2000/28 521-527.

Vedeoche A et al. Recentioence survival in Europe: a 2000-02 period analyse of URCCARE-4 deb. Lancet Oncol 2007 8:784-06. DHA 18 markets. Audithis from http://www.nhamocristics.uk-com/kins.ukh.nb/ (J.

econand: May 2011. 9. McKerra, Blatal, The Cambodge Pulmorary Hypertension Outcome Raview. (CAMPHOR): A measure of health-related quality of the and quality of file for patients with pulmorary benefits and related file Research 2006;15:102-115.

pulmorary hypertension. Quality of the Research 2006;15:103-115.

10. Peacock, A. Treatment of Pulmorary Hypertension. SWJ 2009;225:325-835.

11. Rubin et al. Bosenten thampy for pulmorary atteid hypertension. New England Jo.

of Medicine 2012;945:505-003 12. Bedwech et al. Abettect 27/27: Maintenance of Improvement in S-Minute W with Long Term Separation Treatment Results of the SREATHE-1 Open-Label E

outby Cecusion 2005; (146), 516 13. Outby et al. Long-Term Ambrisantan Therapy for the Freshment of Pulmonary Assent Hopertansion, Journal of the J

restment of Pulmorary Atland Ingrammann, Jaumal of the American College of Ce 005-54-1071--1981 4 49. Elliots, Clet al. Worldwicks physician education and training in pulmorary hyperten Umonary was take disease the oldball preparative. CHEST 2010-19749-559-144

pulmonary wascular disease: the global perspective. CHEST 2010; 197(9) \$55° 94s 15. Pescock AJ et al. An spidemiological study of pulmonary attend hypertension. Eu Respir J 2007;30:104–103

 ESC/EPS Quidelines. Quidelines for the diagnosis and treatment of pulmoner, hypertension. European Heart Journal (2008) 30, 2493-2537

# Setting of Acute illness in chronic PH

- RV failure [49%]
- Progressive Respiratory failure [18%]
- Sudden Cardiac death [17%]
- Cardiopulmonary resuscitation is rarely successful
- Hospital Mortality
  - 28% in Mild PH
  - 67% in moderate PH
  - 80% in Severe PH

#### The sexy Stuff

Systemic circulation

Left heart

Systolic function

## **SOME STATISTICS:**

100% of men didn't notice King Kong is on the picture

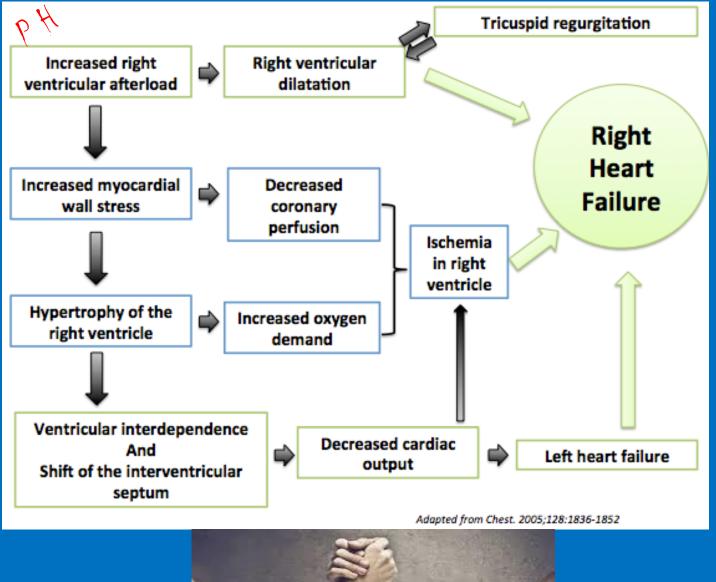


#### The not so sexy Stuff

Pulmonary circulation

Right heart

Diastolic function





## **Pulmonary hypertension**

**Physical Examination** 

**ECG** R in V1, RAD, RAE, RBBB and TWI

#### **CXR**

Prominent PA, peripheral pruning in PAH, and cardiomegaly

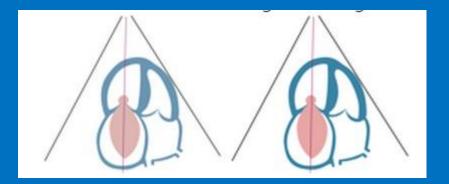
Edema\*\*

#### \*\*These are later findings associated with the development of right heart failure secondary to pulmonary hypertension. PRECORDIUM JVP Prominent 'a' wave Palpation: Prominent 'v' wave · Parasternal heave Elevated JVP\*\* Palpable p2 Positive Kussmaul's sign\*\* Positive Abdominojugular Ausculation: reflex\*\* Loud P2 Narrowed/widening of S2 S4. S3\*\* Systolic pulmonary ejection click Ejection midsystolic pulmonic murmur **ABDOMEN** Diastolic pulmonary regurgitation murmur Ascites\*\* Pansystolic tricuspid Painful hepatomegaly\*\* regurgitation murmur\*\* Pulsatile liver\*\* **LEGS PULSE**

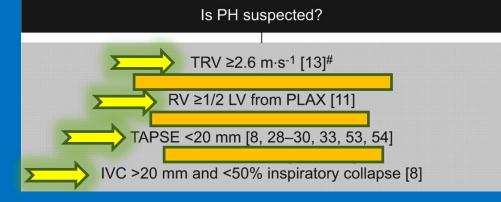
· Diminished\*\*

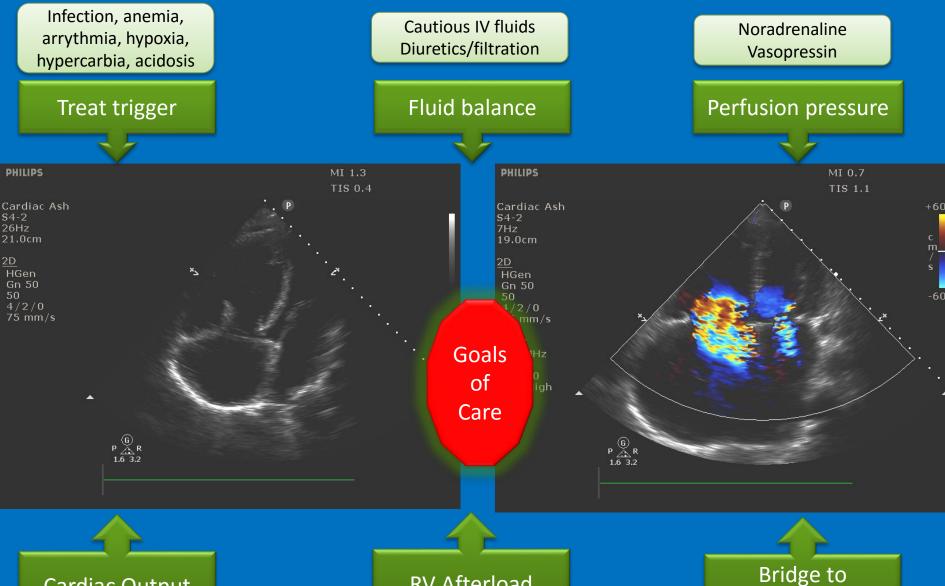
# 2D Echocardiogram

# $PASP = RVSP = 4 x [TR V_{max}]^2 + RAP$



IVC (diameter)	Inspiration	RA pressure
small (	Collapsing	0 – 5 mmHg
normal (1.5- 2.5cm)	> 50% diameter reduction	5- 10 mmHg
dilated (>2.5cm)		10- 15 mmHg
IVC + liver veins dilated	no diameter change	> 20 mmHg





## Cardiac Output

Dobutamine, Milrinone, Levosimendan **RV Afterload** 

NO, Prostacyclins..

Definitive therapy

ECMO, Transplant

### **Hypertensive Hypotension**

Systolic BP < 90 or MAP <65

Echo looking for LV & RV function

Call expert help!
Complete
assessment of
shock

Suggestion of Pulmonary hypertension

Fluid 200ml boluses Dobutamine Infusion

Norad infusion

Milrinone

Levosimendan

Treat Trigger
Discuss Goals
of Care
Arterial line
Central Line

Treat accordingly

LV and Lungs

 $TR V_{max}$ 

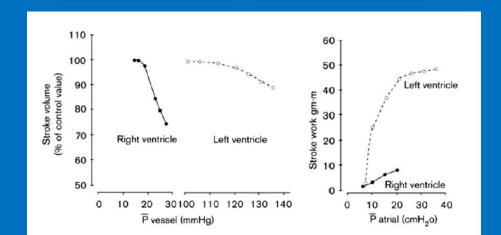
**TAPSE** 

**RVD** 

**IVC** 

PE or RV

infarct



Nitric Oxide Prostacyclins

## You have decided to Intubate







#### Preparation

- Pre-oxygenation
- Invasive monitoring
- Vasoactive

#### Induction

- Fentanyl
- Propofol
- Ketamine
- Ketofol

#### **Paralysing**

- Suxamethonium
- Rocuronium
- Apnoea

#### Ventilation

- PEEP
- TV

# Conclusion

- Pulr
- Right
- Echeller
- Goa



