

Role of POCUS in Pulmonary Hypertension: a case report

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BACKGROUND

Pulmonary hypertension (PH) is a debilitating, progressive disease with an incidence reportedly higher than in other developed countries possibly due to higher burden of endemic risk factors (i.e. HIV, schistosomiasis, sickle cell disease²).

Patients with PH in Africa tend to present to healthcare late, resulting in delayed diagnosis and treatment, worse outcomes and a higher mortality rate.²

CASE REPORT

56 y/o F PMH presumed asthma requiring multiple admissions, was being treated with bronchodilators and supplementary O₂. Admitted to KATH 2 yrs prior with acute respiratory failure, hypoxic arrest, found to have PE, refractory despite treatment. Diagnosed with pHTN after Bedside TTE showed RVSP in 80s. Managed by cardiology with sildenafil, lasix, aldactone and was reportedly stable for over 1 year.

Presented to OSH "feeling unwell" and admitted for lobar pneumonia. Then, sudden loss of consciousness, gasping for air, hypoxic cardiac arrest. CPR, Epi 3mg, patient intubated, ROSC. Transferred to ICU at KATH. Likely PE from LLE DVT, therapeutic anticoagulation initiated, IV lasix, sildenafil. Bedside TTE showed RVSP 68, moderate TR, dilated RA and RV with "D" shape LV during systole and diastole. Started on norepinephrine and milrinone infusions. Required 2 weeks of ICU care to wean off inotropic support and optimize medical management.

TTE vs. RHC for diagnosis of pHTN

	RHC	TTE
Diagnostic criteria	mPAP >25 mmHg	RVSP >35 mmHg in absence of pulmonary stenosis or acute RHF
Pros	Gold standard Measures PA pressures directly Distinguishes pre- vs. post-capillary pHTN (PVR, PAWP)	Cheaper, noninvasive, more common in low-resource settings Point-of-care availability Incremental information can guide management
Cons	Expensive Invasive with risks of complications Requires specialized referral centers	Only moderate specificity (72%) Estimate PASP by adding RVSP (requires TR jet) to RAP (IVC width, collapsibility) Low accuracy in patients with lung diseases

Comparison of pHTN in Africa vs. developed countries

	Africa	Developed countries
pHTN Etiology	69% left heart disease (RHD in up to 28%), 16% PAH, 11% lung disease, 2% CTEPH, 2% multifactorial ⁹	52.6-67.9% left heart disease, 7.5% lung disease, 1.3% CTEPH, while 10.5% unknown (Italy, Australia)
Diagnostics	TTE is most commonly used (83% sensitivity, 72% specificity) ⁷ 1 in 25 studies used RHC ⁸ (very limited access)	RHC = gold standard for diagnosis TTE is screening test
Prognosis	Majority with late presentation, advanced HF state and poor functional status High 6-month mortality rate (21, 28%) ^{9,6}	Mortality in adults with PH was 14.5% at 1 year (Canada) Mortality was highest in groups 2 and 3 and lowest in group 1 (disease specific therapy)

CONCLUSIONS

PH has worse prognosis in Africa possibly due to late presentation and misdiagnosis. RHC, gold standard for diagnosis, is not available in most centers. TTE is the most common diagnostic modality. The increasing availability and use of TTE by non-cardiologists, especially in acute care (ED, ICU) settings may help to decrease the time to diagnosis and improve outcomes.

Challenges include cost of ultrasound machines and need for increased specialized training. More high quality studies will be needed to determine the efficacy of POCUS in screening for pulmonary hypertension.

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Background

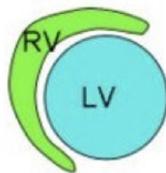


- **Pulmonary hypertension (PH)** is a debilitating, progressive disease characterized by remodeling of the pulmonary vasculature which can lead to right heart failure and eventual death.
- **Incidence of PH in sub-saharan Africa is reported to be higher** than Europe, US, or Australia possibly 2/2 higher burden of endemic risk factors such as rheumatic heart disease, schistosomiasis, tuberculosis, sickle cell disease, HIV², poorly controlled HTN, higher prevalence of SLE, systemic sclerosis
- Patients with PH in Africa tend to present to healthcare late, resulting in delayed diagnosis and treatment, worse outcomes and a **higher mortality rate**²
- Right heart catheterization is the gold standard for PH diagnosis, but rarely available in Africa and low-resource countries.

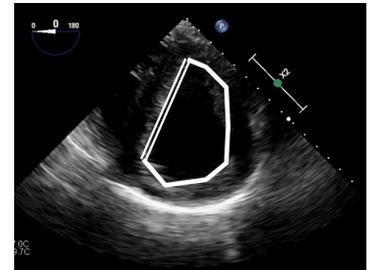
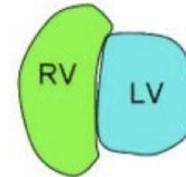
Case Report

Patient with “Asthma” -> pHTN diagnosis

- 56 y/o F PMH “asthma” requiring multiple admissions, treated with bronchodilators and O2.
- Admitted to KATH 2 yrs ago with acute respiratory failure, hypoxic arrest, found to have PE, refractory despite treatment.
- Later that admission, diagnosed with pHTN after bedside TTE showed RVSP in 80s. Managed by cardiology with sildenafil, lasix, aldactone and reportedly stable for over 1 year.



RV overload



Presentation / Hospital Course

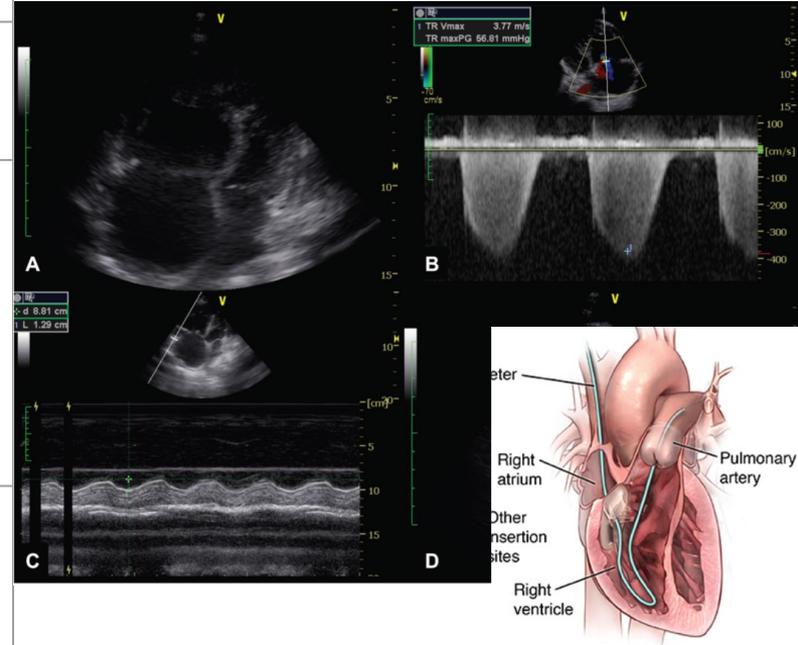
- Presented to OSH “feeling unwell” and admitted for lobar pneumonia. Then, sudden loss of consciousness, gasping for air, hypoxic cardiac arrest. CPR, Epi 3mg, patient intubated, ROSC.
- Transferred to ICU at KATH. Likely PE from LLE DVT, therapeutic anticoagulation initiated, IV lasix, sildenafil.
- Bedside TTE showed signs of RV failure with RVSP 68, moderate TR, dilated RA and RV with “D” shaped LV during systole and diastole. Started on norepinephrine and milrinone infusions. Required 2 weeks of ICU care to wean off inotropic support and optimize medical management.

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Conclusion

- PH has worse prognosis in Africa possibly due to late presentation and misdiagnosis.
- RHC, gold standard for diagnosis, is not available in most centers. TTE is the most common diagnostic modality in Africa.
- The increasing availability and use of TTE by non-cardiologists, especially in acute care (ED, ICU) settings may help to decrease the time to diagnosis and improve outcomes.
- Challenges include cost of ultrasound machines and need for increased specialized training. More high quality studies will be needed to determine the efficacy of POCUS in screening for PH.



