Management of pulmonary hypertension for infants & children with cardiac arrest in the hospital setting – A Scoping Review

critical care canada FORUM

SickKids THE HOSPITAL FOR SICK CHILDREN

International Liaison Committee on Resuscitation ILCOR

AUTHORS

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INTRODUCTION

Guidelines for the resuscitation of cardiac arrest in pediatric patients with pulmonary hypertension (PH) needed to be updated by ILCOR's Pediatric Life Support (PLS) and Neonatal Taskforces.

OBJECTIVES

- To identify the evidence and the gaps in the literature regarding the management of cardiac arrest in infants and children with pulmonary hypertension in the in-hospital setting.

PICOST

Population: Infants and children with pulmonary hypertension and a cardiac arrest in the in-hospital setting;
Intervention: Specific management strategies including 1) respiratory management and monitoring to avoid hypoxia and acidosis; 2) use of opioids, sedatives & neuromuscular blocking agents; and 3) pulmonary arterial hypertension (PAH)-specific targeted therapy drugs;
Comparators: Standard care without specific strategies for pulmonary hypertensive crisis.
Outcomes: All including survival to hospital discharge with good neurological outcome and survival to hospital discharge;
Study Designs: Randomized controlled trials (RCTs) and non-RCTs (interrupted time series, controlled before-and-after studies, cohort studies) included. Case series with a set of at least 5 cases. All languages included if there was an English abstract;
Timeframe: 2012 to 2022.

METHOD

- PRISMA-ScR (*Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews*) checklist was used;
- Pubmed MEDLINE ®, Embase, and the Cochrane Central Register of Controlled Trials databases were searched using keywords; abstracts uploaded in Rayyan and reviewed by at least 2 researchers;
- Articles that did not fill these criteria but served as background literature, such as Guidelines and Systematic Reviews, were selected in a separate set of evidence.

RESULTS

- Figure 1: diagram of selected abstracts;
- Table 1: New reports of studies including patient-level data with pulmonary hypertension and cardiac arrests.

Figure 1

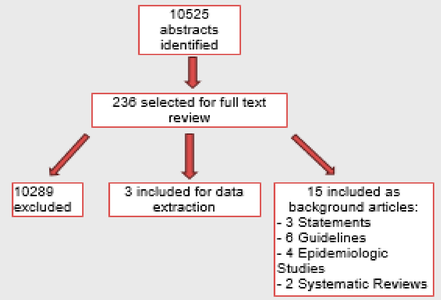

Table 1

Study (author/ year)	Country	Population Included	Design	Age group	Exclusion criteria	N Patients Analyzed, (N events)	Total Patients with PH and CA	Treatment Exposure	Overall study sample survival (%)	Survival in patients with PH and CA (%)
Morell, 2019	USA	Cannulated to ECMO with previous PH	Retrospective multicenter registry study	28d to 18y	<28d	605 patients, (634 ECMO runs)	106 (ECPR)	PH with ECMO	48.70%	ECPR survival 27.4%
Li, 2022	China	PAH who underwent RHC	Retrospective study	<18 y	cardiac shunts, complex CHD, left heart disease, lung disease and other types of PH	147 patients, (163 RCH)	5	PH with RHC	146/147 patients (99.3%)	4/5 (80%)
Boudjemline, 2017	France	Drug-resistant PAH who underwent Potts shunt	Case series	5.9 to 17.9 yo	Not described	6	2	ECMO provided to both cardiac arrest events	4 of 6 (67%)	0 of 2 (0)

CONCLUSION

- Insufficient studies to suggest specific interventions for the management of cardiac arrest in children with PH;
- New contributions such as new disease classification will help with future research;
- Prevention of cardiac arrest remains paramount and should be prioritized in this high risk population.

ACKNOWLEDGEMENTS

We acknowledge The ILCOR 2022 and 2023 members of the Pediatric Life Support Task Force (PLS) and Neonatal Task Force (NLS) and Scientific Advisory Committee (SAC).

REFERENCES

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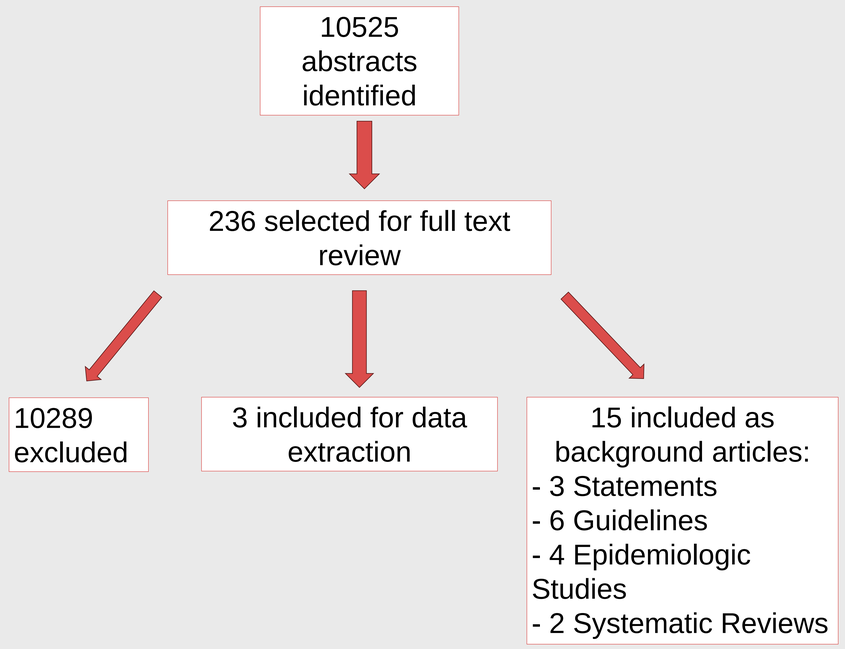

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Figure 2

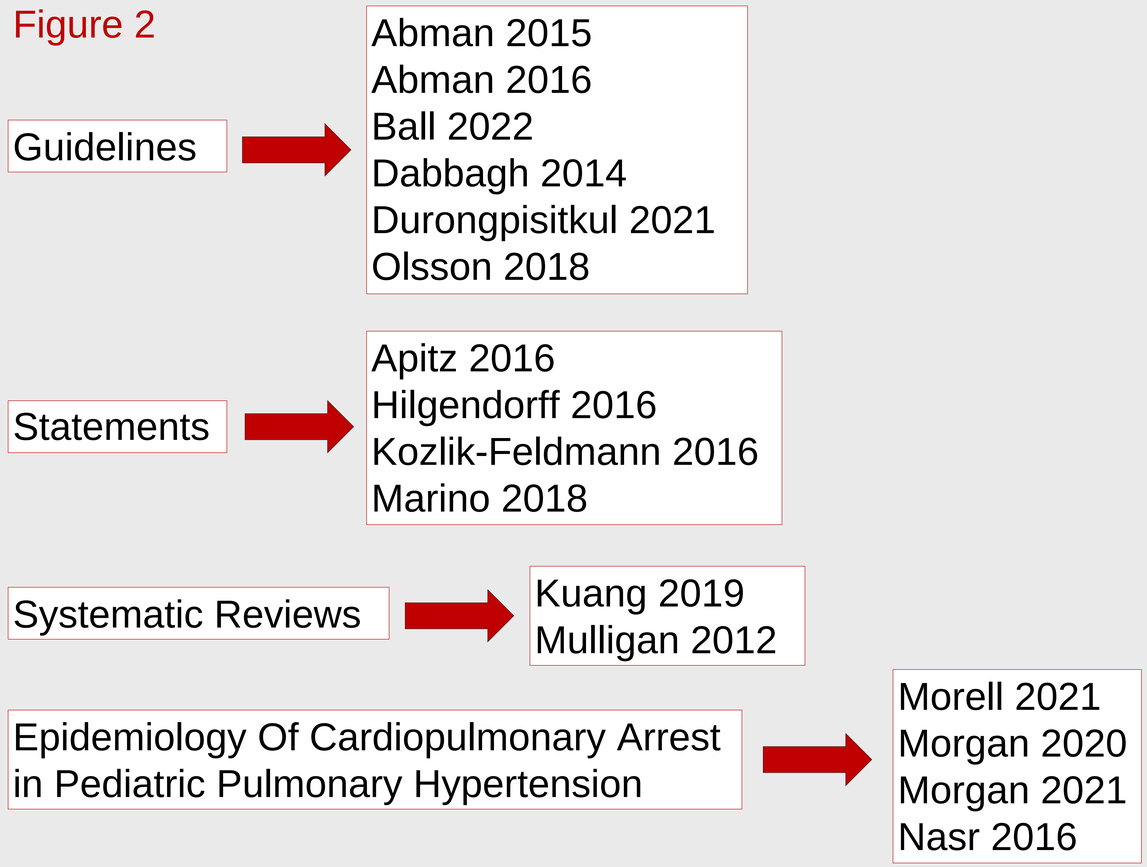

Figure 2: 16 articles framing background literature. Articles report high risk of mortality in children with PH and international efforts in creating a pediatric PH disease classification.

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