

In-Flight Hemodynamic Signatures: A High-Frequency Monitoring Approach to Identifying Critical En Route Care Events

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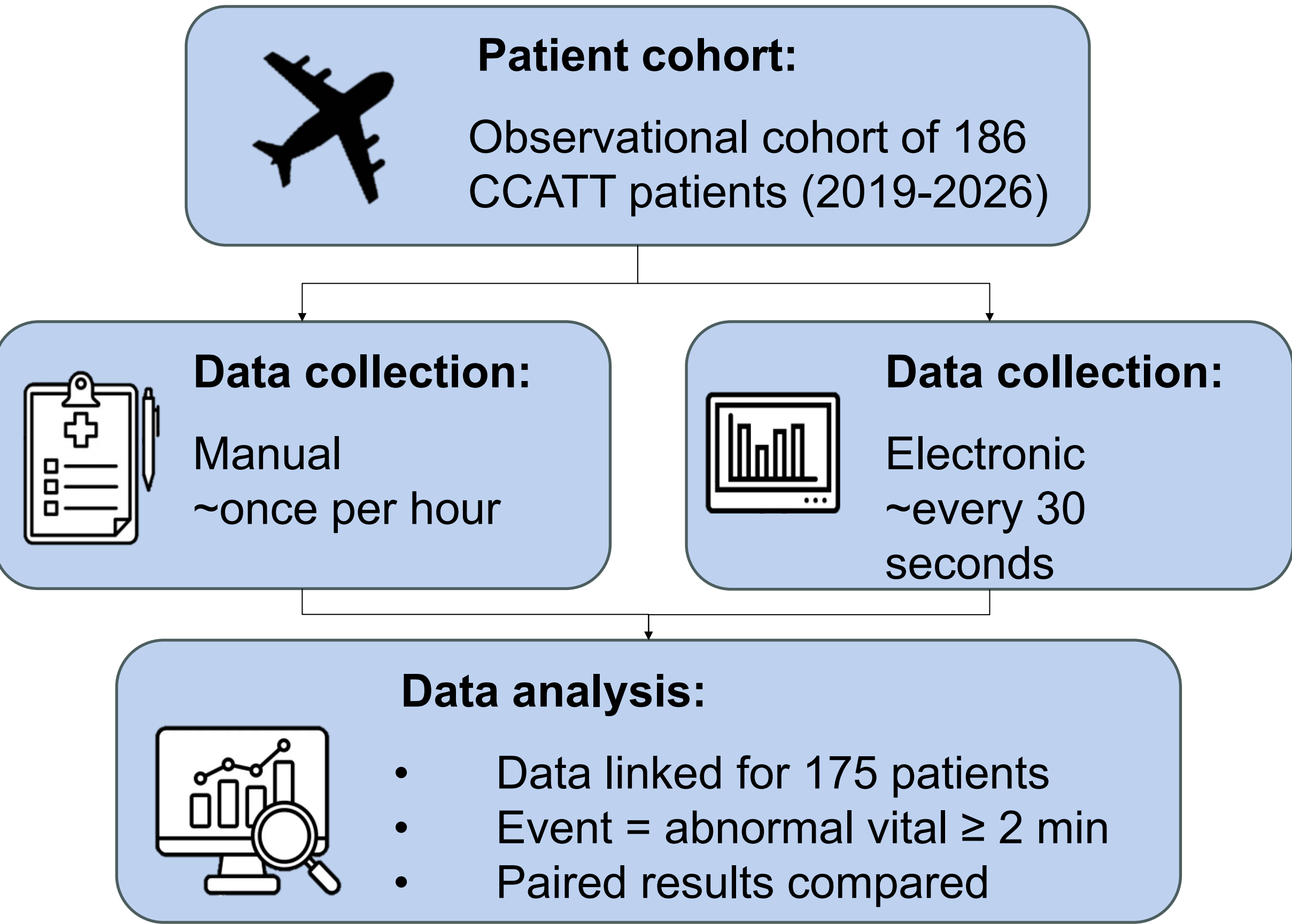
Background

- The impact of flight-related stressors on combat-wounded patients during aeromedical evacuation is a critical En Route Care (ERC) research priority.
- Current patient monitoring relies heavily on handwritten records, with vital signs typically documented hourly.
- This sparse data collection method may fail to capture many significant in-flight hemodynamic events.

Objectives

- Evaluate the frequency and duration of in-flight hemodynamic abnormalities captured by a patient monitor.
- Assess the agreement between electronically captured vital signs and handwritten documentation from Critical Care Air Transport Teams (CCATT).

Methods



Results

- Most patients were male (80%), transported for medical illness (69%), with a median age of 31 years.

Table 1. Percentage of Patients with Detected Events

	Manual documentation	Electronic monitoring
SpO2 ≤ 90%	4.0%	43.4%
SBP ≤ 90 mmHg	9.1%	19.4%
HR > 140 beats/minute	0.0%	13.1%

Figure 1. Comparison of hemodynamic events

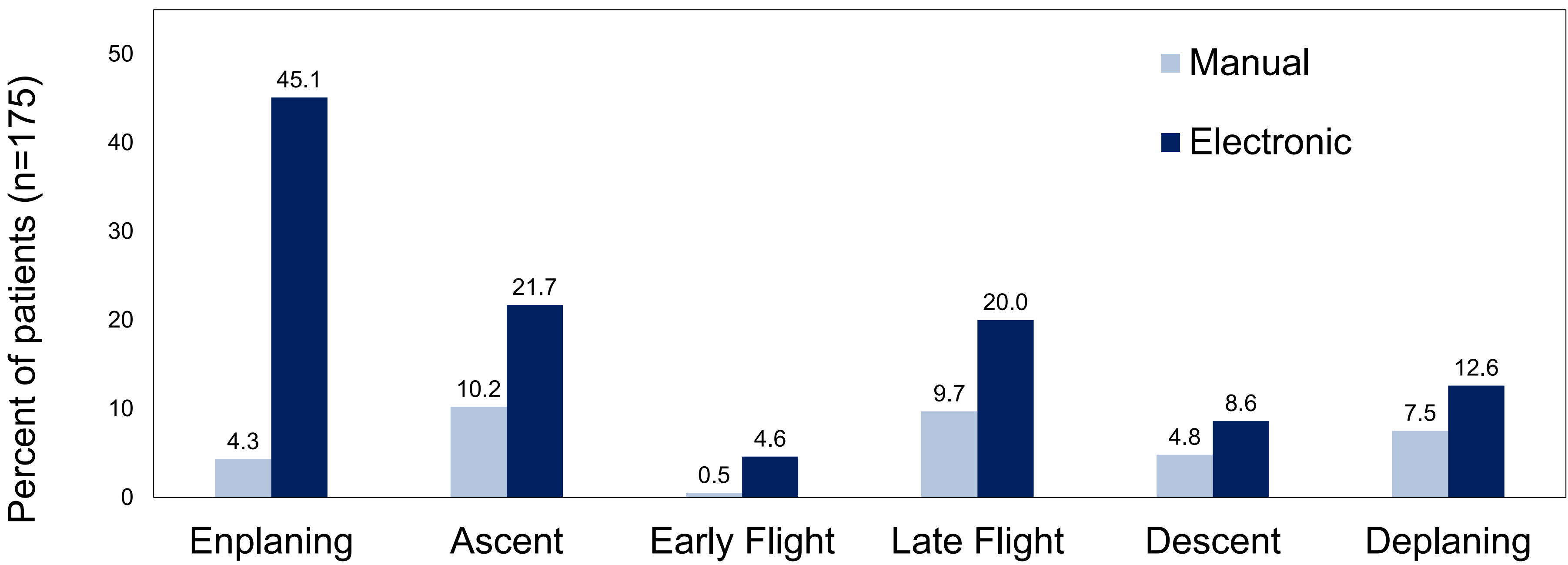
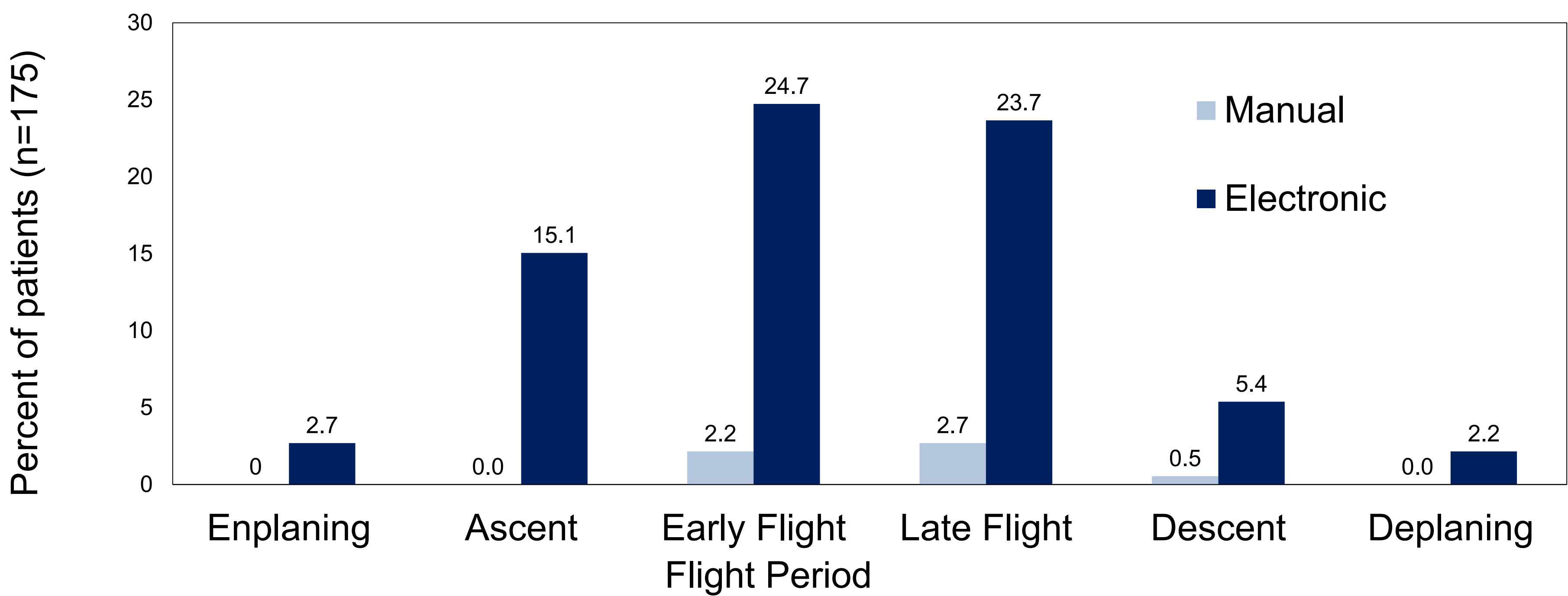


Figure 2. Percent of patients with hypoxia by flight period



Results

Table 2. Baseline Patient Characteristics

Transport indication	
Medical illness	129 (69.4%)
Traumatic injury	57 (30.6%)
Interventions	
Oxygen	122 (65.6%)
Mechanical ventilation	38 (20.4%)
Chest tube	12 (6.5%)
Wound vac	11 (5.9%)
Blood product	9 (4.8%)
ICP monitor	6 (3.2%)

Conclusion

- High-frequency electronic monitoring captures critical physiological shifts, revealing that hypoxia and hypotension are far more common than standard tracking suggests.
- The highest concentration of hemodynamic events occurred during the early phases of transport.
- Continuous electronic tracking in En Route Care offers the opportunity to improve quality improvement data collection for in-flight exposures

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