Clinician variation in treating acute severe childhood wheeze in Emergency Departments of the UK & Ireland – an international survey

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Introduction

Asthma is the most common chronic medical condition of childhood and one of the most common reasons for emergency attendance and hospital admission. Rates in the UK & Ireland are amongst the highest in the world, with NHS spending on asthma exceeding £1 billion annually. National clinical guidelines and quality standards for childhood wheeze have existed for several years, though there is a paucity of evidence in some areas.

Significant variation in practice has been demonstrated in other settings. It is already known that variations in hospital admission rates, bed days and length of stay exist across primary care trusts in our setting. Such variation may result in poorer health outcomes, unnecessary medical treatments and increased strain on the healthcare system.

Aim

To assess whether variation exists in the clinical care of acute severe childhood wheeze across the UK & Ireland.

Methods

Two-stage survey of PERUKI Emergency Departments (EDs). Stage one assessed department practice, including information on clinical practice guidelines (CPGs), care pathways and site specific features including admission location. In stage two, consultants provided information on personal practice including assessment and management, inhaled and intravenous bronchodilators, escalation, and alternative treatments.

Results

30 (100%) EDs and 183 (81%) clinicians responded. 29 (97%) EDs had CPGs and 12 (40%) had care pathways. All reflected national guidance with variations mainly in drug and dose selection. 20 (66.7%) described specific admission areas for children on intravenous (IV) therapy.

Variation existed in dose, timing and frequency of inhaled bronchodilators across severities. 117 (63.9%) used nebulisers in the presence of hypoxia and metered dose inhalers in its absence.

Criteria for escalation to IV therapy differed (***Table 1***) as did first line IV drug preference (***Figure 1***). 87 (48%) gave IV agents sequentially and 30 (16%) concurrently, with others basing approach on case severity. 146 (80%) continued inhaled therapy after commencing IV bronchodilators.

5 strategies were employed for IV salbutamol (T***able 2***), with 10-fold variation in infusion rates, and 60-fold variation in bolus/loading dose.

Of 170 who used IV salbutamol, 146 (86%) gave rapid boluses, 21 (12%) a loading dose and 164 (97%) an ongoing infusion, each with a range of doses and durations.

Of 142 who used IV aminophylline, 127 (89.4%) gave a bolus and infusion, with a total of 132 (93%) giving a bolus overall – this varied in dose from 5-10 mg/kg. Of 173 who used IV MgSO4, all used a bolus only. 41 (24%) used non-invasive ventilation.

148 (81%) respondents stated they would be prepared to enrol patients to a randomised controlled trial allocating salbutamol, magnesium or aminophylline as the initial IV agent.

Table 1: Reasons for IV therapy

Reason	Number (%)
Deteriorating severe wheeze	170 (93%)
Life-threatening wheeze	166 (91%)
No response to inhaled bronchodilators	141 (77%)
Require more than one to be present	167 (92%)
Assess case-by-case	172 (94%)
Standardised criteria (total inhaled dose/time since starting)	11 (6%)

Figure 1: Choice of first line IV agent

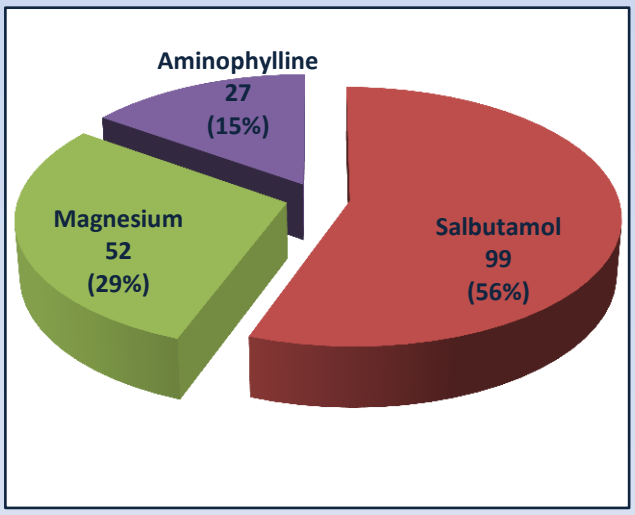

Table 2: IV Salbutamol strategies

Strategy	Number (%)
Bolus then continuous infusion	126 (68%)
Loading dose then continuous infusion	12 (7%)
Continuous infusion only	12 (7%)
Bolus, then loading dose, then continuous infusion	7 (4%)
Bolus only	5 (3%)
Don't use	13 (7%)
Other	8 (4%)

Conclusions

- Significant variation in ED management of childhood wheeze exists across the UK & Ireland despite national guidance.
- Key areas include inhaled and IV bronchodilator selection, dosage and frequency, reflecting a paucity of evidenced to underpin recommendations.
- The low number of sites with care pathways represents an opportunity to share best practice.
- There is an urgent need for multi-centre studies to address the paucity of evidence to inform recommendations.