

Asthma Exacerbations Requiring ICU: Risk Factors and Challenges in Management

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Dear Editor,

Asthma is a common condition affecting 1 in 12 people in Ireland¹. Asthma exacerbation requiring ICU admission (AE-ICU) is associated with increased risk for asthma death². We performed an audit on pre-ICU management of patients with AE-ICU at Beaumont Hospital (BH) from 2014-2019.

Medical records were reviewed regarding presentation and clinical course, timing and choice of treatments and imaging results. Patient care was compared to recognised standard of care National Clinical Effectiveness Committee (2015) asthma guidelines¹.

There were 468 asthma admissions to BH within the time period with 15 (3.2%) AE-ICU. 11 (73%) were female. Mean age was 45.4 years (SD $\pm$ 17.2). 53% (n=8) had a BMI greater than 30kg/m². Current or former smoking was common at 60% (n=9). We found high rates of prior ICU admission (67%, n=10) and asthma-related admissions in the prior 12 months (67%, n=10). 33% (n=5) required mechanical ventilation. 73% (n=11) were admitted to ICU within 24 hours of presentation. There were no asthma deaths.

80% (n=12) had undocumented or inaccurate assessment of exacerbation severity. 60% (n=9) had a peak expiratory flow (PEF) measurement documented but continued monitoring to assess treatment response was poor.

40% (n=6) received first nebuliser and corticosteroid dose within the recommended timeframe of 5-15 minutes¹. Median time to first nebuliser was 24 minutes (range 6-94) and median time to first corticosteroid 25 minutes (range 6-553). 93% (n=14) received intravenous steroids. Excessive corticosteroid dosing was common with 75% (n=12) receiving higher than recommended doses.

100% (n=15) received antibiotics. Guidelines recommend against routine prescription of antibiotics in acute asthma.¹ We deemed antibiotics to not be indicated in at least 33% (n=5).

87% (n=13) received intravenous Magnesium Sulphate (MgSO₄). We found use of additional parenteral bronchodilator agents was variable. 7% (n=1) received intravenous aminophylline, 7% (n=1) received intravenous ketamine and 20% (n=3) received intravenous salbutamol. 67% (n=10) received no parental bronchodilator prior to ICU transfer.

Consistent with prior literature our cohort demonstrated multiple features known to be associated with severe asthma or risk of asthma death including active smoking, obesity, prior AE-ICU and emergency department attendance in the last year with acute asthma exacerbation². Recognising these risk factors is crucial and can help identify patients at higher risk of deterioration.

We found suboptimal initial assessment of exacerbation severity with a tendency to underestimate severity. The majority of patients had insufficient PEF monitoring although measurement may not be possible or appropriate in critical illness. Timely administration of nebulised bronchodilators and corticosteroids was challenging with only 40% having treatment initiated within the guideline recommended interval.

We found routine overuse of antibiotics and excessive corticosteroid dosing. Corticosteroids are associated with a dose-dependent increase in the risk of developing adverse effects which begin at cumulative doses of as little as 0.5-1g³. The use of biologics for managing acute exacerbations may reduce the corticosteroid burden for this cohort in the future with a recent trial demonstrating Benralizumab to be an effective treatment alone or in combination with corticosteroids for acute eosinophilic exacerbations.

Declarations of Conflicts of Interest:

None declared.

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