Evidence Table 18. Managing Exacerbations: IV Aminophylline

Abbreviations used in table:
- **CI** confidence interval
- **FEV₁** forced expiratory volume in 1 sec.
- **IV-A** intravenous aminophylline
- **OR** odds ratio
- **P** placebo
- **PEFR** peak expiratory flow rate
- **PICU** pediatric intensive care unit
- **SMD** standardized mean difference
- **WMD** weighted mean difference

* indicates primary outcome
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<th>Parameter &amp; Value</th>
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| **Meta-analysis of randomized, controlled trials published between 1971 and 2009** | To determine whether inhaled aminophylline (IV-A) has an additional bronchodilator effect in adult patients with acute asthma when used in conjunction with inhaled beta-agonists with or without corticosteroids (inhaled, oral, and/or intravenous) | Fifteen trials, 11 from the United States and one each from Australia, the United Kingdom, Uruguay, and Malaysia, yielding 17 trial comparisons. All were published between 1979 and 1994. Overall methodological quality was moderate (mean Jadad score of 3.2), concordance of allocation adequate in 7 trials. Only three trials had sample sizes larger than 30 subjects/group. | Age: 
- 16 yr although two studies included subjects >15 yr and two >14 yr, upper limit ranged from 40 to 80 yr. | Gender: not reported | Acute asthma or acute exacerbation of asthma and previous diagnosis of asthma. Airflow limitation described as severe in 12 trials as defined by PEFR (<40% predicted or <15 L/min) or FEV1 (<40% predicted in 1 L). Studies conducted in emergency departments. | Am I 
(IV-A) plus generic beta-agonist(s) [n=203] | Arm 2 
Standard care (P) [n=298] | One trials used epinephrine, salbutamol, 3 inhaled beta-agonists, 2 inhaled, 2 albuterol as concurrent beta-agonistic agents. Five trials used hydrocortisone, and 4 used methylprednisolone as corticosteroid concomitantly. | *There was no difference in PEFR or FEV1 between groups at any time period studied. After 12 hours post-intervention, both PEFR (WMD 0.3 L/min, 95% confidence interval [Cl] –0.21 to 0.27) and FEV1 (WMD 2.2% predicted, 95% CI –8.1 to 12.9) were not different from baseline (WMD 0.3% predicted, 95% CI –7.1 to 8.2), and FEV1 (WMD 0.4 L/min, 95% CI –1.4 to 1.6) was not different from baseline (WMD 0.4% predicted, 95% CI –7.7 to 7.8). | Hospital admission was slightly lower but not significant in IV-A vs. P (odds ratio [OR] 0.58, 95% CI 0.30 to 1.02). |
| **Meta-analysis of randomized controlled trials published between 1971 and 2009** | To determine if the addition of inhaled aminophylline to beta-agonists in children over two years receiving inhaled bronchodilators. | Seven trials included five from the USA, one from Australia, and one from Turkey. All were placebo-controlled, double-blind randomized trials published between 1983 and 1996. Overall methodological quality was good (mean Jadad score of 4.5), all had adequate concealment of allocation. | Age: mean age between 5 and 9 yr in all studies but one in which children were slightly older. | Gender: not reported | Acute severe asthma Six studies conducted in emergency departments, one in an inpatient setting. | Arm 1 
IV-A | Arm 2 
Placebo (P) | Patients receiving IV-A had greater improvement in % predicted FEV1, compared to P: 37.6% vs. 15.0% (95% CI 12.4 to 22.7, 2 trials); 22.8% vs. 16.3% (95% CI 14.4 to 20.6, 2 trials) and 21.5% vs. 17.7% (95% CI 14.7 to 21.6, 2 trials). | Differences in symptoms favored IV-A at 6-8 hrs (WMD –0.6, 95% CI –0.76 to –0.44, 2 trials) with no difference at 24 hrs (WMD –0.33, 95% CI –0.52 to 0.25). | No data were reported on length of stay in ICU. |

Note: WMD = weighted mean difference; CI = confidence interval; P = placebo; IV-A = intravenous aminophylline; PEFR = peak expiratory flow rate; FEV1 = forced expiratory volume in 1 second; BMI = body mass index; OR = odds ratio; SD = standard deviation; CI = confidence interval; IV = intravenous; hs = hours; yrs = years.