

Comparative Economic Evaluation of Additional Respiratory Resources Utilized after Methylxanthine Initiation for the Treatment of Apnea of Prematurity in a South Asian Country

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Abstract : Introduction: Methylxanthines are used for the treatment of AOP, to facilitate extubation and as a prophylactic agent to prevent apnea. Though the popularity of Caffeine has risen, it is expensive in a resource constrained developing countries like India. Objective: To evaluate the cost-effectiveness of Caffeine compared with Aminophylline treatment for AOP with respect to additional ventilatory resource utilized in different birth weight categorization. Design, Settings and Participants - Single centered, retrospective economic evaluation was done. Participants included preterm newborns with < 34 completed weeks of gestation age that were recruited under an Indian Council of Medical Research funded randomized clinical trial. Per protocol data was included from Neonatal Intensive Care Unit, Kasturba Hospital, Manipal, India between April 2012 and December 2014. Exposure: Preterm neonates were randomly allocated to either Caffeine or Aminophylline as per the trial protocol. Outcomes and Measures - We assessed surfactant requirement, duration of Invasive and Non-Invasive Ventilation, Total Methylxanthine cost and additional cost for respiratory support bared by the payers per day during hospital stay. For the purpose of this study Newborns were stratified as Category A - < 1000g, Category B - 1001 to 1500g and Category C - 1501 to 2500g. Results: Total 146 (Caffeine -72 and Aminophylline - 74) babies with Mean \pm SD gestation age of 29.63 ± 1.89 weeks were assessed. 32.19% constitute of Category A, 55.48% were B and 12.33% were C. The difference in median duration of additional NIV and IMV support was statistically insignificant. However 60% of neonates who received Caffeine required additional surfactant therapy ($p=0.02$). The total median (IQR) cost of Caffeine was significantly high with Rs.10535 (Q3-6317.50, Q1-15992.50) where against Aminophylline cost was Rs.352 (Q3-236, Q1-709) ($p < 0.001$). The additional costs spent on respiratory support per day in neonates on either Methylxanthines were found to be statistically insignificant in the entire weight based category of our study. Whereas in Category B, the median O2 charges per day were found to have more in Caffeine treated newborns ($p=0.05$) with border line significance. In category A, providing one day NIV or IMV support significantly increases the unit log cost of Caffeine by 13.6% (CI - 95% ranging from 4 to 24; $p=0.005$) over log cost of Aminophylline. Conclusion: Cost of Caffeine is expensive than Aminophylline. It was found to be equally efficacious in reducing the number duration of NIV or IMV support. However adjusted with the NIV and IMV days of support, neonates fall in category A and category B who were on Caffeine pays excess amount of respiratory charges per day over aminophylline. In perspective of resource poor settings Aminophylline is cost saving and economically approachable.

Keywords : methylxanthines include caffeine and aminophylline, AOP (apnea of prematurity), IMV (invasive mechanical ventilation), NIV (non invasive ventilation), category a - <1000g, category b - 1001 to 1500g and category c - 1501 to 2500g

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