A Comparison of the Effects of Th115a (Fenoterol) and Isoproterenol on Spirometry and Arterial Blood Gases

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The object of this study was to determine the acute effects of fenoterol (Berotec) administered by a metered dose inhaler on ventilation/perfusion relationships as manifested by changes in blood gas composition and spirometric values. Twelve patients from the Hines, Illinois VA Hospital and 12 patients from Northwestern Memorial Hospital, Chicago, were studied. The 24 patients were ambulatory and had previously been diagnosed as having bronchial asthma or asthmatic bronchitis. All had reversible airway obstruction with an improvement of at least 15 percent in their forced expiratory volume in one second within 30 minutes following two inhalations of isoproterenol from a metered dose inhaler. Bronchodilator and antihistamine drug treatment was stopped at least 12 hours prior to the test drug administration. Steroids were continued if the patient was using 10 mg daily or less. The majority of the patients were not using steroids. Isoproterenol and fenoterol were used in a double-blind cross-over comparison so that each patient served as his own control. The interval between tests was not less than 24 hours or more than one week. The total dose of fenoterol was 0.40 mg given as two inhalations of .20 mg each, and the total isoproterenol dose was 0.15 mg divided between two inhalations. Arterial blood and spirometric measurements were made at base line and at 15, 30, 60, 120 and 180 minutes following drug administration.

Peak effects for both drugs occurred at 15 minutes and were equal in magnitude. For all of the spirometric measurements improvement following inhalation of fenoterol was maintained throughout the three-hour period of observation, whereas the improvement following isoproterenol inhalation was maintained for only 30-60 minutes with little residual effect at two hours. The longer duration of action was evident in the FVC and FEV1, as well as in those tests indicative of small airway status—FEF 50 percent and FEF 75 percent. The average values for the decline in Po2 were physiologically insignificant (2-5 mm Hg). The fall in Po2 at 15 minutes following administration of fenoterol was not statistically significant, whereas the decline in Po2 following isoproterenol was significant to three hours (Fig 1). The declines were small, but in the occasional patient they were as great as 10 to 12 mm Hg. There was no significant change in pulse rate, blood pressure or Pco2 at any of the time intervals for either drug.

The mechanism for the decline in arterial Po2 following aerosol bronchodilator administration is uncertain. Although occasionally observed following isoproterenol, it was not observed in these 24 patients following administration of fenoterol in doses sufficient to produce significant and sustained improvement in expiratory airflow.

EFFECTS OF BEROTEC AND ISOPROTERENOL ON PaO2

![Graph showing changes in PaO2](http://journal.publications.chestnet.org/pdfaccess.ashx?url=/data/journals/chest/21009/)