

THE USE OF BRONCHODILATORS AND CORTICOSTEROIDS IN RESPIRATORY SYNCYTIAL VIRUS LOWER RESPIRATORY TRACT INFECTION

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ABSTRACT: We reviewed the treatment practices namely the use of nebulised bronchodilators and oral steroids in 185 children admitted between 1st January 1993 and 31st December 1995 with the diagnosis of RSV chest infection. 135 (73%) of them received nebulised bronchodilators. Nebulised bronchodilators were more likely to be prescribed for patients who were younger (7.85 ± 5.1 vs 11.8 ± 7.4 months, $p = 0.001$), had a family history of bronchial asthma (36% vs 16% $p = 0.008$), a higher respiratory rate (151 ± 15 vs 146 ± 13 per minute, $p = 0.0001$) and Respiratory Distress Assessment Instrument Score (RDAI) score (4.5 ± 2.4 vs 3.0 ± 2.4 , $p = 0.001$). Patients who were clinically assessed to have more severe respiratory distress at admission were also more likely to receive nebulised bronchodilators ($p = 0.03$). Gender, race and the presence of an underlying illness did not influence the decision to administer nebulised bronchodilators. There was, however, no difference in the duration of hospital stay between the patients who received nebulised bronchodilators and those who did not (7.1 ± 4.9 vs 6.6 ± 6.2 days, $p = 0.53$). Only one patient received oral steroid treatment. Nebulised bronchodilators were generally administered to patients who were younger, those with a family history of bronchial asthma and who were clinically in more severe respiratory distress. (*JUMMEC 1997 2(2): 103-106*)

KEYWORDS: Nebulised bronchodilators, Respiratory syncytial virus

Introduction

Respiratory syncytial virus (RSV) is by far the commonest virus responsible for lower respiratory tract infection in the young paediatric age group. In Malaysia, RSV has been isolated in 20% of children diagnosed with lower respiratory tract infection (1). Nonetheless, there is no available treatment that appears to be effective in the management of RSV chest infection and treatment approach is essentially supportive. An effective treatment is understandably more important for patients with RSV chest infection who are at risk of severe disease and respiratory failure. This group of patients are essentially young infants who are less than 6 weeks old or previously premature or have an underlying illness such as congenital heart disease, bronchopulmonary dysplasia or immunodeficiency (2).

Adequate hydration, oxygenation, minimal handling and treatment of any complications such as respiratory failure are the cornerstones of caring for patients with RSV chest infection (3, 4). The use of nebulised bronchodilators in the treatment of this group of patients remains controversial. However, there is still a trend among clinicians to administer nebulised bronchodilators despite

the apparent lack of benefit from this mode of treatment as reported in the literature (5).

The objective of this study is to determine the treatment practices of clinicians namely in prescribing nebulised bronchodilators and oral steroids for children admitted with RSV chest infection.

Material and Methods

This study is a retrospective review of children who were admitted to the Department of Paediatrics, University Hospital Kuala Lumpur from 1st January 1993 to 31st December 1995 with the diagnosis of RSV chest infection. They were included into the study if they fulfilled the following criteria: 1) aged two years or less; 2) had a respiratory illness with cough, running nose, breathlessness, wheeze and tachypnoea, crepitations or rhonchi; and 3) RSV was isolated in nasopharyngeal secretions.

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We reviewed all the case notes of these patients with special emphasis on the treatment prescribed for them. The clinical condition of the patients at admission was also evaluated with the use of a modified Respiratory Distress Assessment Instrument Score (RDAI Score) as illustrated in Table I (6,7). The sum total of all 4 clinical parameters based on the patient's clinical condition would equal the RDAI score. The severity of respiratory distress of these patients was then categorised into mild (RDAI score 0 - 4), moderate (RDAI score 5- 8) and severe (RDAI score 9 - 12).

Data collected was then entered and analysed using SPSSWin Version 6.13 statistical programme. The student's t test was used to compare quantitative data and differences between proportions were compared using the Chi Square test. A p value of less than 0.05 was considered statistically significant.

Results

The treatment profile of 185 patients were studied. 135 (73%) of them received nebulised bronchodilator therapy. Nebulised ipratropium bromide was used in 70 % of these patients while 11 % and 19% of them received nebulised salbutamol or a combination of both, respectively.

Clinicians were more likely to prescribe nebulised bronchodilators to patients who were younger and in those who had a family history of bronchial asthma (Table 2). There was, however no difference in the use of bronchodilators when considering the gender, ethnicity or the presence of an underlying illness in this group of patients. Patients who received nebulised bronchodilators also had higher heart rates, respiratory rates and RDAI scores. Patients clinically assessed to have moderate and severe respiratory distress at admission as defined by the RDAI score were also more likely to receive nebulised

bronchodilators. The mean duration of hospital stay was, however, similar in patients who received nebulised bronchodilators and those who did not (7.1 ± 4.9 days vs 6.6 ± 4.2 days, p value 0.53). Only one patient received oral steroids during his hospital stay.

Discussion

Respiratory illnesses constitute one of the commonest childhood diseases that require hospital admission. Although RSV is recognised as an important aetiological agent of lower respiratory tract infection in young children, there is no well established treatment that is considered effective for this condition. The majority of these infections are mild and self limiting. RSV chest infection in patients at risk of severe disease constitute the group of patients in whom an effective treatment is needed. Although the mortality of this illness remains low, 20 -30% of these 'high risk' patients will develop respiratory failure (2) and require paediatric intensive care which at present is a rather limited and expensive facility. The cornerstone in the treatment of RSV chest infection remains supportive with maintenance of adequate oxygenation, fluid intake and monitoring for respiratory failure.

There appears to be a tendency to prescribe nebulised bronchodilators in our study population as almost three quarters of them received either nebulised ipratropium bromide or salbutamol or both. The degree of respiratory distress on admission namely a higher RDAI score and respiratory rate is most likely to have prompted the clinician to prescribe bronchodilators for this group of patients. The use of nebulised bronchodilators in RSV chest infection remains a controversial management issue with the apparent benefit from its use being questionable. Numerous

Table I . Modified Respiratory Distress Assessment Instrument Score (RDAI Score)

Clinical Parameter	Score 0	Score 1	Score 2	Score 3
Respiratory rate	Less than 40 per minute	40 - 60 per minute	61 - 70 per minute	More than 70 per minute
Use of accessory muscles	None	One accessory muscle used	Two accessory muscles used	Three or more accessory muscles used
Colour/Cyanosis	Pink in room air/no cyanosis	Cyanosed when crying	Pink with oxygen supplement or cyanosed on room air	Cyanosed with oxygen or cardiorespiratory arrest
Auscultation finding	Normal	Decreased air entry No rhonchi	Decreased air entry Rhonchi heard	Silent chest

studies have shown an apparent lack of benefit from the use of bronchodilators in RSV bronchiolitis (7, 8, 9) and a more worrying consequence is that its use may be associated with a detrimental effect on the patient (10, 11). Despite its misgivings as reported in the literature, clinicians still favour the administration of nebulised bronchodilators to this group of patients (5, 12), not unlike in our study population. A meta analysis carried out on clinical trials that studied the efficacy of nebulised bronchodilators in bronchiolitis showed that its use was significantly associated with a favourable effect on the patients' clinical condition but did not influence hospitalisation or improve oxygen saturation in these patients (13). In our study population, ipratropium bromide was more commonly used than salbutamol as the nebulised bronchodilator of choice. Perhaps this preference may be due to the fact that salbutamol has been reported to be ineffective in very young patients (14) and ipratropium bromide has an advantage due to its effect on bronchial secretion and mucosal oedema. Nonetheless, studies have shown that ipratropium bromide is not more effective than salbutamol whether given individually or in combination for the desired bronchodilator effect in these patients (15, 16). Instead, nebulised adrenaline has been shown to have a more effective bronchodilator property when compared to salbutamol and a placebo (17). However, adrenaline is not widely prescribed for bronchiolitis and none of our patients received nebulised adrenaline. It would appear that there is no clear indication for the use of nebulised bronchodilators for RSV chest infection. It is, however, recognised that there may be a subset of patients with RSV chest infection whose respiratory

distress will respond to nebulised bronchodilators (18, 19) and therefore, a trial of nebulised bronchodilators for these patients is an acceptable clinical option. The nebulised bronchodilators may be continued if there is a favourable clinical response as determined by the clinician.

Airway inflammation causing bronchiole narrowing and air trapping plays an important role in RSV chest infection. These changes share many clinical and pathophysiological similarities to childhood asthma suggesting that the effective therapeutic approaches used for the treatment of bronchial asthma may be effective in treating RSV chest infection. Interestingly, this unproven assumption has prompted clinicians to prescribe corticosteroids, a conventional asthma treatment, for RSV bronchiolitis (12, 20). Clinicians treating our study population did not routinely prescribe corticosteroids as only one patient, a 14 month old Chinese boy who was initially diagnosed to have acute asthma for his first wheezing episode received prednisolone. There is no role for corticosteroids in the treatment of RSV bronchiolitis even in patients with a family history of atopy or asthma (21, 22).

There are many other modalities of treatment for RSV chest infection in addition to nebulised bronchodilators and corticosteroids. Ribavirin is the only approved antiviral agent for RSV infection. Although it was initially shown to improve the clinical status, shorten viral shedding and reduce the need for ventilation and oxygen supplementation, a re-evaluation of the efficacy of Ribavirin in RSV infection did not show significant benefit with its use and it is therefore no longer routinely recommended (23). Other modalities of treatment that

Table 2. Patient characteristics and clinical features

	Group who received nebulised bronchodilators	Group who did not receive nebulised bronchodilators	p value
Mean age (months)	7.8 ± 5.1	11.8 ± 7.4	0.001
Sex (M : F)	76 : 59	35 : 15	0.120
Race (M:I:C:Ind)*	82:21:26:6	22:15:12:1	0.090
Family history of asthma	36%	16%	0.008
Underlying illness	26%	26%	1.000
Heart rate (per minute)	151 ± 15	146 ± 13	0.050
Respiratory rate (per minute)	58 ± 12	50 ± 11	0.001
TWBC (10 ⁹ /L)	13.2 ± 5.3	12.0 ± 4.8	0.230
RDAI score	4.5 ± 2.4	3.0 ± 2.4	0.001
Respiratory distress			
Mild	65%	35%	
Moderate	89%	11%	0.030
Severe	80%	20%	

* M:I:C:Ind = Malay : Chinese : Indian : Indonesian

has been evaluated in RSV infection include Vitamin A supplementation (24) and Interferon alpha 2A (25).

In conclusion, the majority of patients in our study population received nebulised bronchodilators especially if they were young infants with clinically more severe respiratory distress and a family history of bronchial asthma. Although there is a tendency for our clinicians to prescribe nebulised bronchodilators for these patients, its use is not clearly supported by the literature.

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