Córdoba, Jueves 28 de Septiembre de 2017
Mesa Redonda *Decisiones en el Servicio de Emergencias*

Soporte Respiratorio en el Servicio de Emergencias

Pedro B. Rino
Hospital de Pediatría "Prof. Dr. Juan P. Garrahan"
Universidad de Buenos Aires

38° Congreso Argentino de Pediatría

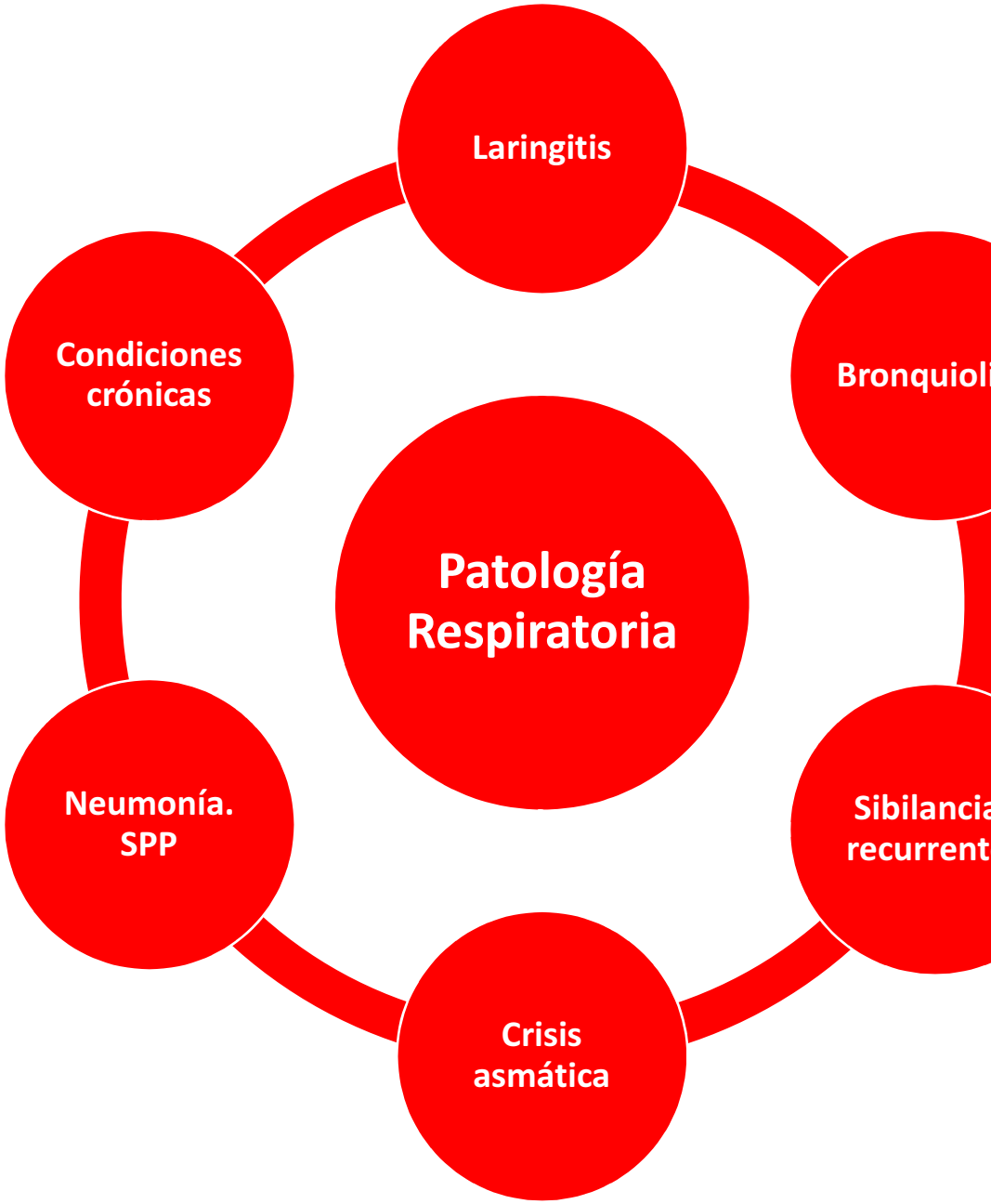
Sociedad Argentina de Pediatría

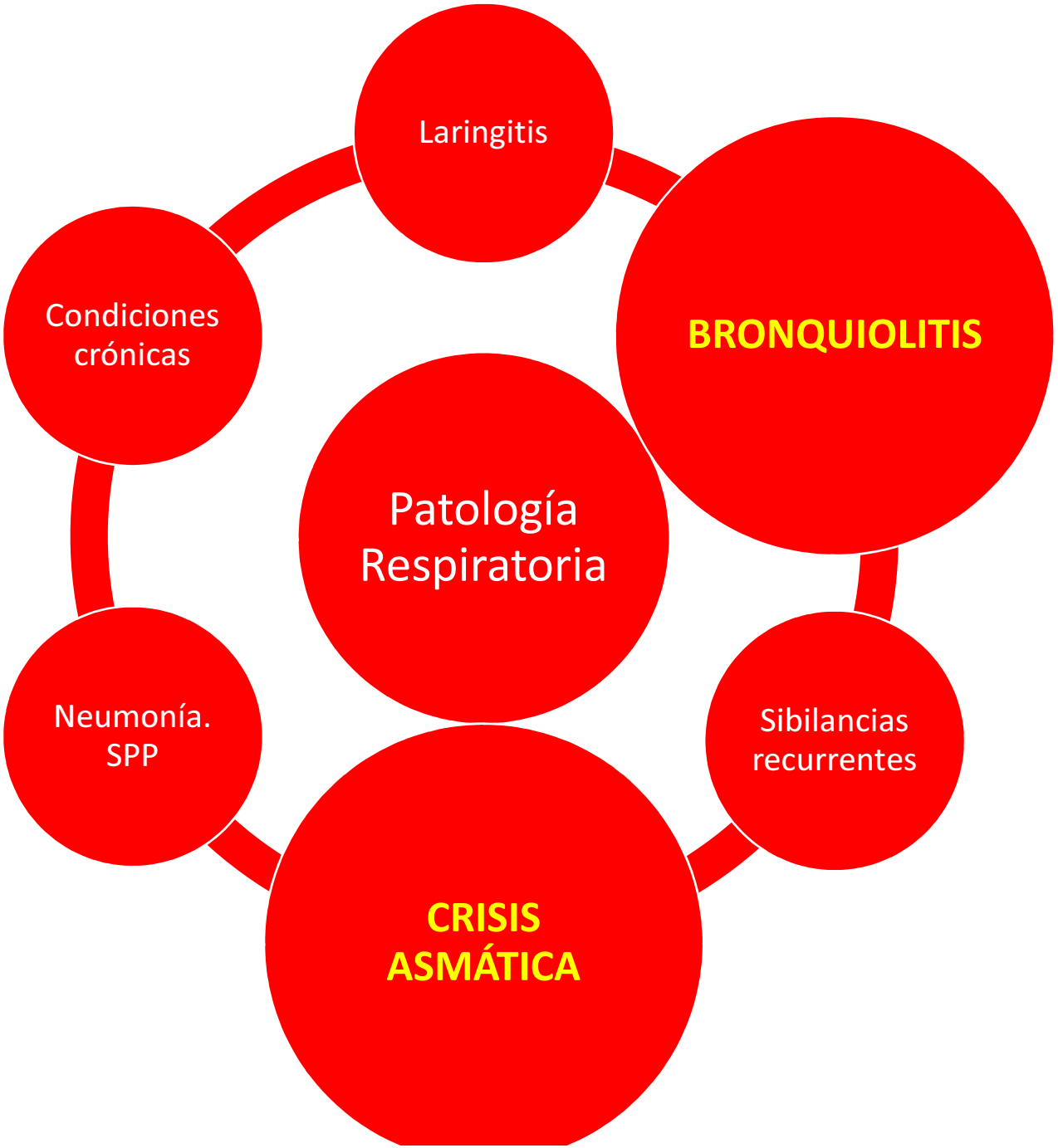
Conflicto de intereses

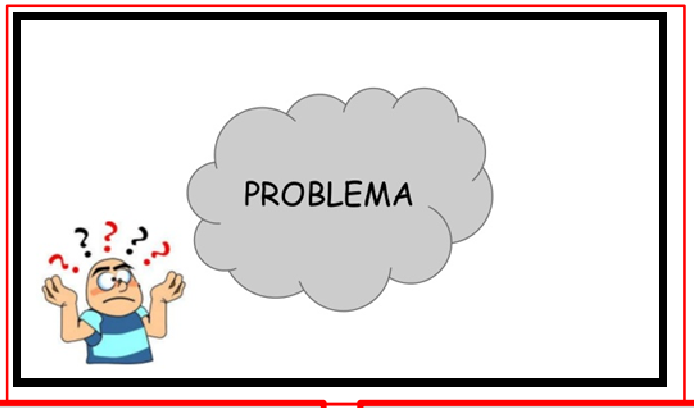
Ninguno que declarar

¿POR QUÉ HABLAR DE ESTO?

Porque tenemos problemas…




Laringitis
BRONQUIOLITIS
Condiciones crónicas
Patología Respiratoria
Neumonía. SPP
Sibilancias recurrentes
CRISIS ASMÁTICA

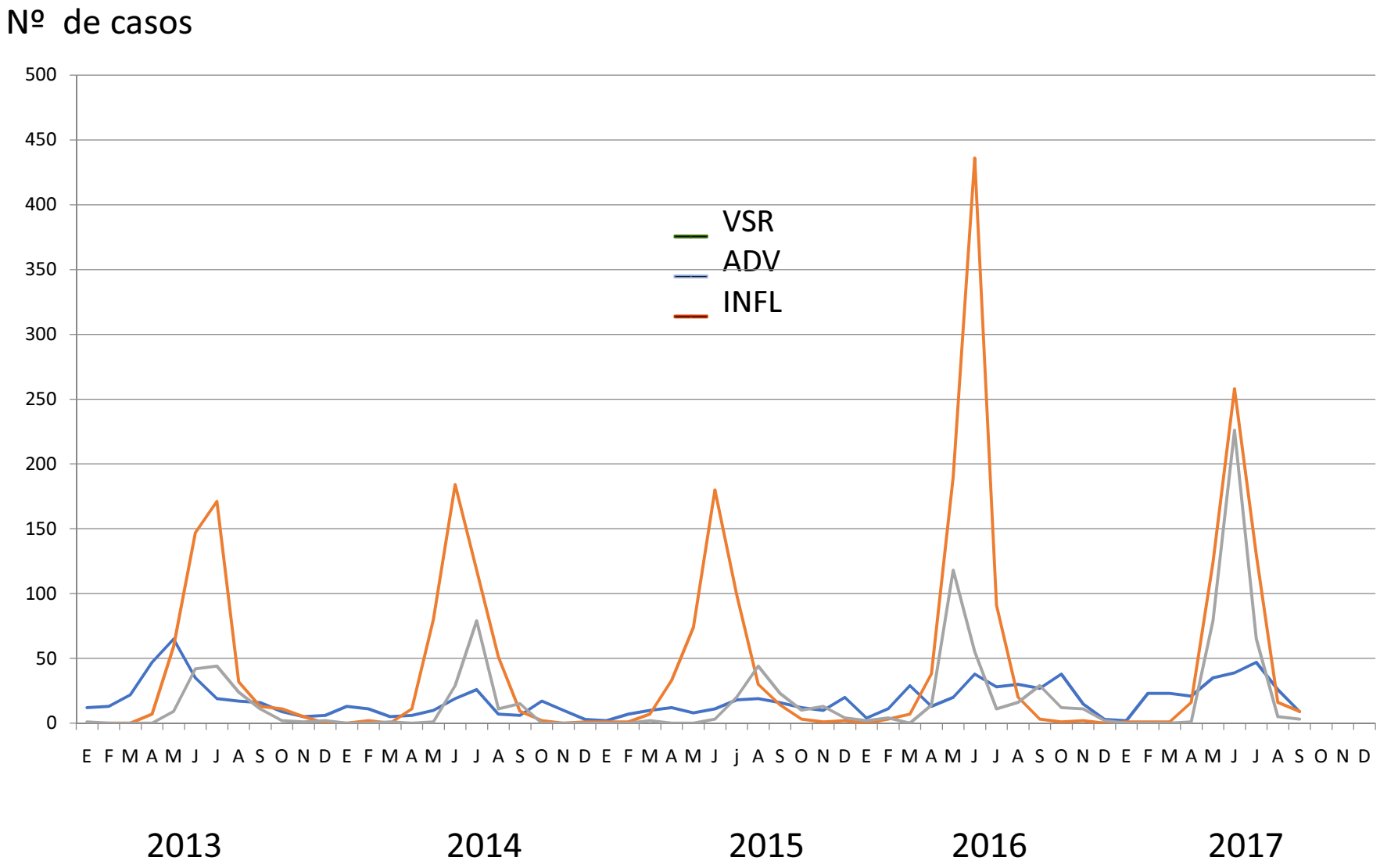


Bronquiolitis | **Asma**

- ✓ **Consultas frecuentes**
- ✓ **Internaciones frecuentes**
- ✓ **Inadecuada evaluación y tratamiento**
- ✓ **Recursos de atención afectados**
- ✓ **Costos aumentados**

Virus respiratorios estacionales - Pacientes internados
UCIP – UCIN - CIM

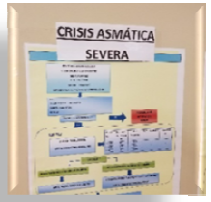
Hasta el 19/09/2017

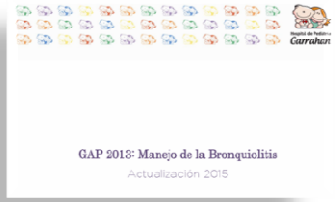


Hospital de Pediatría «Prof. Dr. Juan P. Garrahan»

¿QUÉ SE PROPONE HACER?

- ✓Protocolos de Actuación
- ✓Guías de Atención Pediátrica
- ✓Series de Pediatría Garrahan
- ✓ECCri SAP
- ✓SLEPE Grupo de Trabajo Respiratorio
- ✓PERN-RIDEPLA





PERN International Asthma Working Group

Pharmacotherapy Practice, Patterns And Outcomes In Bronchiolitis In The Americas, Australia/New Zealand And Europe

DIFERENCIAS

SOPORTE RESPIRATORIO

¿QUÉ HACER Y QUÉ NO HACER?

Soporte Respiratorio en el Servicio de Emergencias

38° CONGRESO ARGENTINO de PEDIATRÍA

La Niñez de Hoy

DESAFÍO, OPORTUNIDAD Y ESPERANZA

Una vez más…
BRONQUIOLITIS

¿QUÉ HACER Y QUÉ NO HACER?

¿POR DÓNDE ARRANCAMOS?

AGONISTAS β 2

COCHRANE 2014

Cochrane Library

Cochrane Database of Systematic Reviews

Bronchodilators for bronchiolitis (Review)

Gadomski AM, Scribani MB

No:

- ✓ **Mejora la $SatO_2$**
- ✓ **Reduce los ingresos**
- ✓ **Disminuye la estan**
- ✓ **Disminuye el tiemp de evolución (resolución)**

onchodilators such as albuterol or salbutamol do [redacted], do not reduce hospital [redacted] after outpatien atment, do not shorten the [redacted] and do not reduce the [redacted] at home. Given th verse side effects and the expense associated with these treatments, bronchodilators are [redacted] in the routine managemen bronchiolitis. This meta-analysis continues to be limited by the small sample sizes and the lack of standardized study design an idated outcomes across the studies. Future trials with large sample sizes, standardized methodology across clinical sites and consisten essment methods are needed to answer completely the question of efficacy.

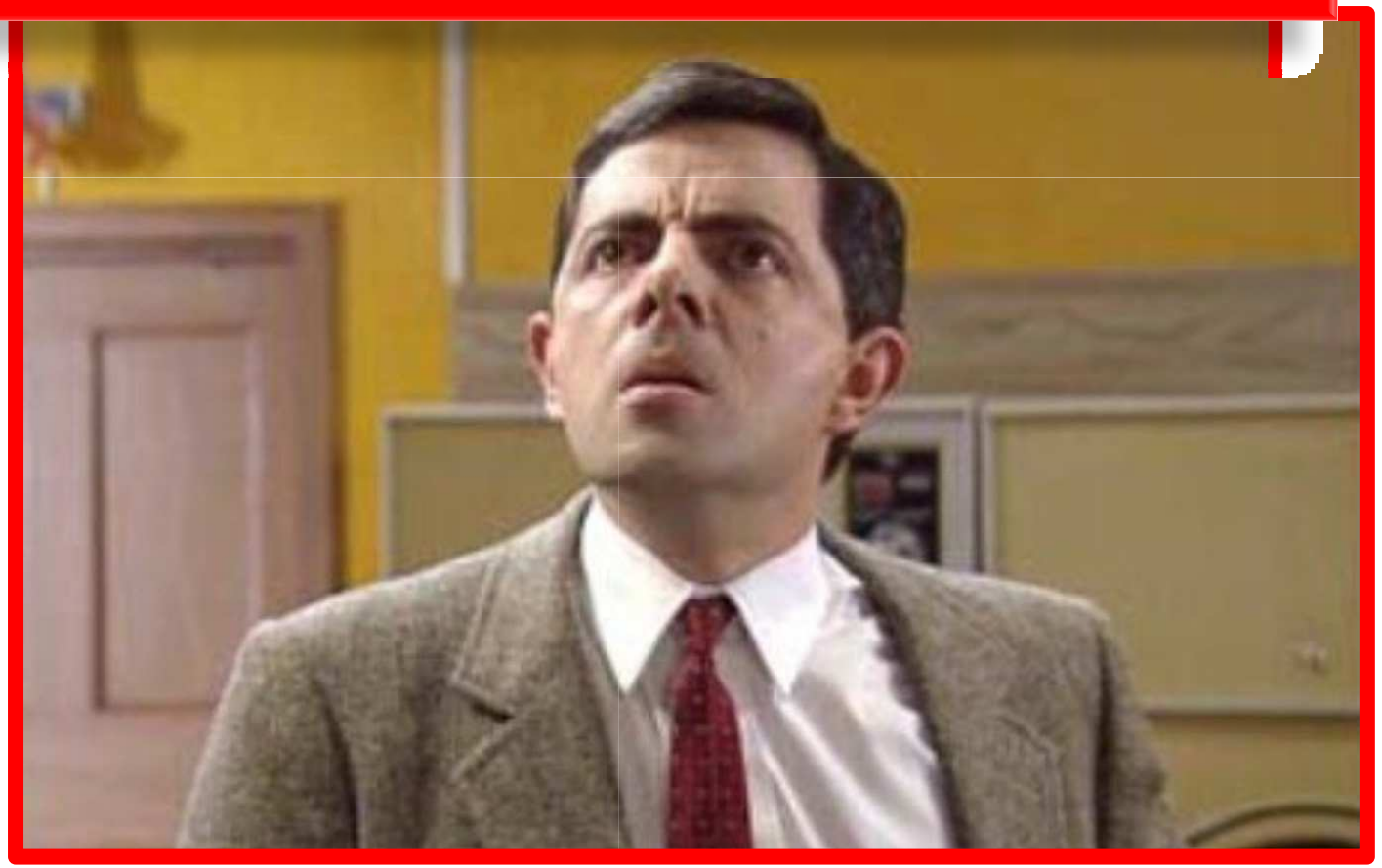
Cochrane Database of Systematic Reviews 2014, Issue 6. Art. No.: CD001266.
DOI: 10.1002/14651858.CD001266.pub4.

www.cochranelibrary.com

WILEY

¿Y LOS ANTICOLINÉRGICOS?

Bromuro de Ipratropio…¿SI ó NO?



COCHRANE 2005

Cochrane Library

Cochrane Database of Systematic Reviews

Anticholinergic drugs for wheeze in children under the age of two years (Review)

e is [redacted] support the uncritical use of anti-cholinergic therapy for wheezing infants, although parents using it me were [redacted] benefits.

Everard M, Bara A, Kurian M, N'Diaye T, Ducharme F, Mayowe V.
Anticholinergic drugs for wheeze in children under the age of two years.
Cochrane Database of Systematic Reviews 2005, Issue 3. Art. No.: CD001279.
DOI: 10.1002/14651858.CD001279.pub2.

www.cochranelibrary.com

WILEY

¿SIRVEN LOS CORTICOESTEROIDES?

Manal Bawazeer y col. ARABIA SAUDITA 2014

RIGINAL ARTICLE

ffect of combined dexamethasone therapy with ebulized r-epinephrine or salbutamol in infants with ronchiolitis: A randomized, double-blind, ontrolled trial

al Bawazeer, Majed Aljeraisy, Esam Albanyan, Alanazi Abdullah[1], Wesam Al Thaqafi, Jaber Alenazi, Zaam Al otaibi[2], ammed Al Ghaihab

rtments of Pediatric, [1]Emergency and [2]Respiratory Services, King Abdulaziz Medical City, Riyadh, Saudi Arabia

Access this article online

site: www.avicennajmed.com

: 10.4103/2231-0770.133333

Quick Response Code:

ABSTRACT

Background: This study investigated the effect of combining oral dexamethasone with either nebulized racemic epinephrine or salbutamol compared to bronchodilators alone for the treatment of infants with bronchiolitis. **Materials and Methods:** This was a double-blind, randomized controlled trial on infants (1 to 12 months) who were diagnosed in the emergency department with moderate-to-severe bronchiolitis. The primary outcome was the rate of hospital admission within 7 days of the first dose of treatment, and the secondary outcomes were changes in respiratory distress assessment instrument score, heart rate, respiratory rate, and oxygen saturation (O_2 Sat) over a 4-hour observation period. Infants ($n = 162$) were randomly assigned to four groups: A (dexamethasone + racemic epinephrine) = 45, B (placebo and racemic epinephrine) =39, C (dexamethasone and salbutamol) = 40, or D (placebo and salbutamol) =38. **Results:** Patients who had received dexamethasone + epinephrine exhibited similar admission rates compared to placebo + epinephrine or salbutamol ($P = 0.64$). Similarly, no statistically significant difference was observed in the rate of hospitalization for patients who received dexamethasone + salbutamol compared to those who received placebo + epinephrine or salbutamol ($P = 0.51$). Clinical parameters were improved at the end of the 4-hour observation period for all treatment groups. Treatment with dexamethasone + epinephrine resulted in a statistically significant change in HR over time ($P < 0.005$) compared to the other groups. **Conclusions:** This study adds to a body of evidence suggesting that corticosteroids have no role in the management of bronchiolitis for young infants who are first time wheezers with no risk of atopy.

Key words: Bronchiolitis, dexamethasone, salbutamol, albuterol, beta2 agonist, racemic, epinephrine, efficacy, randomized trial

RODUCTION

chiolitis is the most common lower respiratory tract ction among infants and the most common cause of italization in this age group. It is characterized by acute mmation, edema and necrosis of the epithelial cells g the small airways, increased mucous production, and chospasms.[1]

current treatments for bronchiolitis are controversial. The stay of treatment is supportive care with supplemental oxygen, adequate hydration and mechanical ventilation as needed.[1,2] Bronchodilators and corticosteroids are widely used but not routinely recommended.[1] While a meta-analysis of the effects of nebulized selective beta2-agonists failed to show any consistent benefit,[3-5] a meta-analysis of the effect of nebulized epinephrine suggested a decrease in clinical symptoms compared with either placebo or albuterol.[6] Several published study on dexamethasone failed to show any difference in hospital admission rate or respiratory clinical score compared with placebo.[7] However, combination

ess for correspondence: Dr. Abdullah Alanazi, College of Applied Medical Sciences, King Saud Bin Abdulaziz University, nal Guards, Riyadh-Saudi Arabia. E-mail: abdullahforaihalanazi@yahoo.com

SIN FACTORES DE RIESGO DE ATOPÍA

✓ **No tiene utilidad**

In conclusion, our study adds to the body of d demonstrating that corticosteroids have [redacted] in management of bronchiolitis. This is particularly cl for younger infants who are first time wheezers with risk of atopy. It is possible that a subpopulation of ol children with a history of atopy who are presenting wit first episode of wheezing and who fit the clinical pictur bronchiolitis may benefit from corticosteroids; however data presented here emphasize the overall need to minim the u[redacted]ts in this disorder.

ediatr. 2017 Jul;7(7):403-409. doi: 10.1542/hpeds.2016-0211. Epub 2017 Jun 15.

ticosteroid Therapy During Acute Bronchiolitis in ents Who Later Develop Asthma.

SL[1], Rotta AT[2], Speicher R[2], Slain KN[2], Gaston B[3].
ns of Pediatric Critical Care Medicine and steven.shein@uhhospitals.org.
ns of Pediatric Critical Care Medicine and Pulmonology, UH Rainbow Babies ildren's Hospital, Cleveland, Ohio.

GROUND AND OBJECTIVE: Meta-analyses show that corticosteroids are not ve in patients with bronchiolitis. However, risk factors for asthma such as eczema lial atopy prompt some practitioners to prescribe corticosteroids for olitis. We assessed if corticosteroid prescription is associated with shorter lization for bronchiolitis among patients who later develop asthma.

ODS: The Pediatric Health Information System database was interrogated for s with bronchiolitis aged <2 years hospitalized between 2006 and 2015. Only s who also later had a hospitalization for asthma and prescription of inha steroids were included. For the initial bronchiolitis admission, use of me tion defined "severe illness," and ICU admission without mechanical ver "moderate illness"; all other patients were deemed to have "mild illness es associated ($P < .10$) with length of stay (LOS) in bivariate analysis w d in linear regression analysis.

LTS: During the bronchiolitis admission of 2479 children who were late lized for asthma, corticosteroid prescription ($n = 857$) was associated wi bivariate analysis (3 [2-4] vs 2 [2-4] days; $P < .01$) but not the multivar ($P = .18$) that included age, sex, comorbid conditions, bacterial pneumonia, and severity. Corticosteroid prescription was associated with shorter LOS among sly healthy children with moderate illness (4 [2-6] vs 5 [3-7] days; $P = .02$) but se with mild or severe illness.

LUSIONS: Corticosteroids w utcome in s with bronchiolitis who were later hospitalized with asthma. Moderately ill s with no comorbidities may warrant further study.

Cleveland, EEUU. 2017

EN NIÑOS QUE POSTERIORMENTE TUVIERON ASMA

EN BRONQUIOLITIS (NO VSR)

Short- and long-term efficacy of prednisolone for first acu rhinovirus-induced wheezing episode

Tuomas Jartti, MD,[a] Riitta Nieminen, BM,[a,b] Tytti Vuorinen, MD,[b] Pasi Lehtinen, MD,[a] Tero Vahlberg, MSc,[c] James Gern, MD,[d] Carlos A. Camargo, Jr, MD, DrPH,[e] and Olli Ruuskanen, MD[a]
Turku, Finland, Madison, Wis, and Boston, Mass

nd: Rhinovirus-induced wheezing is an important risk r recurrent wheezing. There are no randomized d trials on the effect of systemic corticosteroids in with this disease.
e: We sought to study the short- and long-term effects solone treatment of the first acute, moderate-to-severe, s-induced wheezing episode in young children.
: After confirming rhinovirus from nasopharyngeal by using PCR, 79 children with a first wheezing episode to 23 months were randomized to receive oral lone (first dose of 2 mg/kg, followed by 2 mg/kg/d in 2 loses for 3 days) or placebo. The trial was double blind ut the 12-month follow-up. The primary outcomes g term: new physician-confirmed wheezing episode within 2 months, number of physician-confirmed wheezing episodes within 12 months, and initiation of regular controller medication for asthma symptoms within 12 months. The primary interaction analysis examined rhinovirus load.
Results: Seventy-four patients completed the study (mean age, 13 months; 28% atopic). Long-term outcomes did not differ between groups (all $P \geq .30$). For short-term outcomes, the prednisolone group had less cough, rhinitis, noisy breathing, severe breathing difficulties, and nocturnal respiratory symptoms at home within 2 weeks (all $P < .05$). The 25 children with greater than 7000 rhinovirus copies/mL (most sensitive cutoff) benefitted f prednisolone in terms of less risk of physician-confirmed recurr within 2 and 12 months compared with placebo (both $P < .05$).
Conclusions: Prednisolone for all young children experiencing their first acute, mode to-severe, rhinovirus-induced wheezing episode. Prednisolo might be beneficial in a subgroup of children with high v loads. (J Allergy Clin Immunol 2015;135:691-8.)

Key words: *Bronchiolitis, child, corticosteroid, glucocorti treatment, prednisolone, rhinovirus, virus, wheeze, wheezing*

Rhinovirus has been detected in 20% to 40% of whee children during the first 2 years of life in both hospital emergency care settings.[1-3] Rhinovirus-related cause of wheezing is of particular interest because of its strong associ (odds ratios of 3-10 during early life) with recurrent wheezing doctor-diagnosed asthma up to 13 years of age.[4-9] The sugg explanations for this striking association are low interf responses (ie, impaired viral defense), early airway inflamm (ie, a broken epithelial barrier), and genetic variation at the 1 locus in rhinovirus-affected children (ie, might markedly inc the risk of asthma).[10-13]

Overall, randomized controlled trials (RCTs) on the effica systemic corticosteroids in the treatment of early whee have not reported clinical efficacy.[14-16] Virus-specific RCT respiratory syncytial virus (RSV)–induced lower airway il have focused on bronchiolitis and have not found any effi of systemic corticosteroids.[17,18] Previously, in the Vinku s we reported a *post hoc* analysis of RCT data showing that prednisolone during the first wheezing episode wit

From [a]the Department of Pediatrics, Turku University Hospital; the Departments of [b]Virology and [c]Biostatistics, University of Turku; [d]the Departments of Pediatrics and Medicine, University of Wisconsin School of Medicine and Public Health, Madison; and [e]the Department of Emergency Medicine and Division of Rheumatology, Allergy and Immunology, Department of Medicine, Massachusetts General Hospital, Harvard Medical School, Boston.

Supported by the Suomen Akatemia (grant nos. 132595 and 114034), Helsinki, Finland; the Finnish Medical Foundation, Helsinki, Finland; the Sigrid Juselius Foundation, Helsinki, Finland; the Foundation for Pediatric Research, Helsinki, Finland; the

J Allergy Clin Innmmunology. Multicéntrico 2015

Systematic Review Snapshot

TAKE-HOME MESSAGE

use of systemic or inhaled glucocorticoids in children aged 2 years or younger with acute bronchiolitis does [redacted]

THODS

A SOURCES

ature search with Cochrane l Register of Controlled MEDLINE, EMBASE, Latin can & Caribbean Health es Literature, Scopus, and MedEx was performed in nd 2013. The references of nt articles were searched for nal studies. A search of the erature included clinical- ov and ICTRP Search -World Health Organization, views of conference edings from the Pediatric mic Societies, the European atory Society, and the can Thoracic Society were cted.

DY SELECTION

mized controlled trials ring short-term systemic or l glucocorticoids versus o or another intervention in n aged 24 months or younger cute bronchiolitis (defined as isode of wheezing) were d. Primary outcomes were ions by days 1 and 7 for ient studies and length of stay atient studies. Studies were ed from this review if they ed patients with asthma, a of recurrent wheezing and tory distress, or previous

Do Glucocorticoids Provide Benefit to Children With Bronchiolitis?

EBEM Commentators
Carrie Ng, MD
Mark Foran, MD
Department of Emergency Medicine
New York University School of Medicine
Bellevue Hospital Center
New York, NY
Alex Koyfman, MD
Department of Emergency Medicine
UT Southwestern Medical School
Parkland Memorial Hospital
Dallas, TX

Results

Pooled estimates of effect for glucocorticoids versus control.

Outcome	Quality of Evidence (GRADE*)	Relative Effect (95% CI)	Control (Assumed Risk*)	Steroid (Corresponding Risk†)	Number of Participants (Studies)
Admissions, outpatients Follow-up: day 1	High	RR 0.92 (0.78–1.08)	162/1,000	149/1,000	1,762 (8)
Admissions, outpatients Follow-up: day 7	Moderate	RR 0.86 (0.7–1.06)	250/1,000	215/1,000	1,530 (5)
Length of stay, inpatients, days	High	Unable to meta-analyze	0.8–6.6	0.41–6.64	633 (8)

CI, Confidence interval; *RR*, relative risk.
*Assumed risk for admissions was based on the median control group risks across the studies included in the meta-analysis (medium risk).
†Corresponding risk (and its 95% CI) is based on the assumed risk in the comparison group and the relative effect of the intervention (and its 95% CI).

Of the 2,533 studies screened, 17 studies were included in the final analysis, totaling 2,596 patients. Different trial arms of each study were considered as separate comparisons.

Primary outcomes were the number of hospital admissions within 1 day and 7 days of the initial visit in the outpatient setting and length of stay for inpatients. Eight of the studies (N=1,824 patients) included outpatients, mostly from pediatric emergency departments (EDs), whereas 9 studies (N=772 patients) included inpatients only. The secondary outcomes were the following: (1) clinical severity scores such as the

ANNALS OF EMERGENCY MEDICINE 2014. REVISIÓN

Current evidence does [redacted] a clinically relevant effect of [redacted] Combined dexamethasone and epinephrine may reduce outpatient admissions, but results are exploratory ar data limited. Future research should further assess the efficacy, harms and applicability of combined therapy.

COCHRANE 2013

Cochrane Library
Cochrane Database of Systematic Reviews

Glucocorticoids for acute viral bronchiolitis in infants and young children (Review)

Fernandes RM, Bialy LM, Vandermeer B, Tjosvold L, Plint AC, Patel H, Johnson DW, Klassen Hartling L

Fernandes RM, Bialy LM, Vandermeer B, Tjosvold L, Plint AC, Patel H, Johnson DW, Klassen TP, Hartling L.
Glucocorticoids for acute viral bronchiolitis in infants and young children.
Cochrane Database of Systematic Reviews 2013, Issue 6. Art. No.: CD004878.
DOI: 10.1002/14651858.CD004878.pub4.
www.cochranelibrary.com

Corticoides sistémicos ni inhalados:

- ✓ **NO disminuyen ingresos**
- ✓ **NO reducen estancia**

BUENO….
¿Y LA ADRENALINA NEBULIZADA?

COCHRANE 2011

Adrenalina:

- ✓ **NO dosis repetidas**
- ✓ **Si, a corto plazo?**

Cochrane Library

Cochrane Database of Systematic Reviews

Epinephrine for bronchiolitis (Review)

Hartling L, Bialy LM, Vandermeer B, Tjosvold L, Johnson DW, Plint AC, Klassen TP, Patel H, Fernandes RM

This review demonstrates t[redacted]for outpatients, particularly in the first 24 hours of care. Explo[redacted]atory evidence from a single study suggests benefits of epinephrine a[redacted]steroid combined for later time points. More research is required to confirm the benefits of combined epinephrine and steroids among outpatients. There is [redacted] of effectiveness[redacted] or epinephrine and dexamethasone combined among inpatients.

Hartling L, Bialy LM, Vandermeer B, Tjosvold L, Johnson DW, Plint AC, Klassen TP, Patel H, Fernandes RM.
Epinephrine for bronchiolitis.
Cochrane Database of Systematic Reviews 2011, Issue 6. Art. No.: CD003123.
DOI: 10.1002/14651858.CD003123.pub3.

www.cochranelibrary.com

WILEY

Skjerven H y col. Noruega. NEJM 2013

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Racemic Adrenaline and Inhalation Strategies in Acute Bronchiolitis

Håvard Ove Skjerven, M.D., Jon Olav Gjengstø Hunderi, M.D., Sabine Kristin Brügmann-Pieper, M.D., Anne Charlotte Brun, M.D., Hanne Engen, M.D., Leif Eskedal, M.D., Ph.D., Marius Haavaldsen, M.D., Bente Kvenshagen, M.D., Ph.D., Jon Lunde, M.D., Leif Bjarte Rolfsjord, M.D., Christian Siva, M.D., Truls Vikin, M.D., Petter Mowinckel, M.Sc., Kai-Håkon Carlsen, M.D., Ph.D., and Karin C. Lødrup Carlsen, M.D., Ph.D.

From the Department of Pediatrics, Oslo University Hospital (H.O.S., J.O.G.H., P.M., K.-H.C., K.C.L.C.), and the Institute of Clinical Medicine, University of Oslo (H.O.S., K.-H.C., K.C.L.C.), Oslo; the Department of Pediatrics, Østfold Hospital Trust, Fredrikstad, Østfold (J.O.G.H., M.H., B.K., J.L.); the Department of Pediatrics, Vestre Viken Hospital Trust, Drammen, Buskerud (S.K.B.-P.); the Department of Pediatrics, Vestfold Hospital Trust, Tønsberg, Vestfold (A.C.B., C.S.); the Department of Pediatrics, Telemark Hospital Trust, Skien, Telemark (H.E.); the Department of Pediatrics, Sørlandet Hospital Trust, Kristiansand, Vest-Agder (L.E.); and the Department of Pediatrics, Innlandet Hospital Trust, Elverum, Hedmark (L.B.R.), and Lillehammer, Oppland (T.V.) — all in Norway. Address reprint requests to Dr. Skjerven at Oslo University Hospital, Department of Pediatrics, Ullevål, Postboks 4956 Nydalen, 0424 Oslo, Norway, or at h.o.skjerven@medisin.uio.no.

N Engl J Med 2013;368:2286-93.
DOI: 10.1056/NEJMoa1301839

ABSTRACT

BACKGROUND

Acute bronchiolitis in infants frequently results in hospitalization, but there is no established consensus on inhalation therapy — either the type of medication or the frequency of administration — that may be of value. We aimed to assess the effectiveness of inhaled racemic adrenaline as compared with inhaled saline and the strategy for frequency of inhalation (on demand vs. fixed schedule) in infants hospitalized with acute bronchiolitis.

METHODS

In this eight-center, randomized, double-blind trial with a 2-by-2 factorial design, we compared inhaled racemic adrenaline with inhaled saline and on-demand inhalation with fixed-schedule inhalation (up to every 2 hours) in infants (<12 months of age) with moderate-to-severe acute bronchiolitis. An overall clinical score of 4 or higher (on a scale of 0 to 10, with higher scores indicating more severe illness) was required for study inclusion. Any use of oxygen therapy, nasogastric-tube feeding, or ventilatory support was recorded. The primary outcome was the length of the hospital stay, with analyses conducted according to the intention-to-treat principle.

RESULTS

The mean age of the 404 infants included in the study was 4.2 months, and 59.4% were boys. Length of stay, use of oxygen supplementation, nasogastric-tube feeding, ventilatory support, and relative improvement in the clinical score from baseline (preinhalation) were similar in the infants treated with inhaled racemic adrenaline and those

5-hour difference in length of stay and to perform subgroup analyses for the major outcomes. The study included a nationally representative patient cohort with the expected patterns of viral infection.[4] In addition, the study was managed in accordance with local and national guidelines, and the baseline characteristics were similar in all four treatment groups (Table S1 in the Supplementary Appendix).

Despite the limited power of the study to detect an interaction between the interventions, the observed interaction was approximately one third

charge for all children. The results were similar with the use of these two end points (Table S5 in the Supplementary Appendix).

In conclusion, our study showed that for hospitalized infants with acute bronchiolitis, inhaled racemic adrenaline [redacted] to inhaled saline with regard to [redacted], use of supportive treatment, [redacted]. However, the administration of inhalations on demand, as compared with a fixed schedule of inhalations, was associated with a shorter hospital stay and with a reduced need for supportive treatment.

Kus K, Lee S. Malasia 2014
Combinación
Adrenalina + Corticoides

- ✓ **No disminuyó la admisión**
- ✓ **No redujo la estancia**

frontiers in Pharmacology

MINI REVIEW
published: 22 June 2017
doi: 10.3389/fphar.2017.00396

Systematic Review and Meta-Analysis of the Efficacy and Safety of Combined Epinephrine and Corticosteroid Therapy for Acute Bronchiolitis in Infants

*Kok P. Kua[1,2] and Shaun W. H. Lee[1]**

[1] School of Pharmacy, Monash University Malaysia, Bandar Sunway, Malaysia, [2] Department of Pharmacy, Petaling District Health Office, Ministry of Health Malaysia, Petaling Jaya, Malaysia

Combined treatment of e[redacted] was i[redacted] in infants with bronchiolitis. The therapy appeared to be well-tolerated and pooled data showed some improvements in oxygen saturation favoring the combined therapy. The minimal benefit did not support its use in the treatment of bronchiolitis.

Combined Epinephrine and Corticosteroid Therapy for Acute Bronchiolitis in Infants. Front. Pharmacol. 8:396. doi: 10.3389/fphar.2017.00396

ineffective in reducing hospital admission and length of stay among infants with bronchiolitis.

Keywords: bronchiolitis, epinephrine, corticosteroid, dexamethasone, respiratory syncytial virus infections, infant, meta-analysis, systematic review

Allergic diseases and the effect of inhaled epinephrine in children with acute bronchiolitis: follow-up from the randomised, controlled, double-blind, Bronchiolitis ALL trial

Håvard Ove Skjerven, Leif Bjarte Rolfsjord, Teresa Løvold Berents, Hanne Engen, Edin Dizdarevic, Cathrine Midgaard, Bente Kvenshagen, Marianne Hanneborg Aas, Jon Olav Gjengstø Hunderi, Karen Eline Stensby Bains, Petter Mowinckel, Kai-Håkon Carlsen, Karin C Lødrup Carlsen

Lancet Respir Med 2015; 3: 702–08

Published Online August 26, 2015 http://dx.doi.org/10.1016/S2213-2600(15)00319-7

See Comment page 665

See Online for a podcast view with Håvard Skjerven and Karin Lødrup Carlsen

tute of Clinical Medicine, University of Oslo, Oslo, Norway (H O Skjerven MD, fsjord MD, T L Berents MD, J O G Hunderi MD, K E Stensby Bains MD, Prof K-H Carlsen PhD, f K C Lødrup Carls tment of Pediatr University Hospit Norway (H O Hunderi, K E Stens

Summary

Background Although use of inhaled bronchodilators in infants with acute bronchiolitis is not supported by evidence-based guidelines, it is often justified by the b aimed to assess if inhaled epinephrine during bronchial obstruction, atopic eczema, or allerg

Methods In the randomised, double-blind, m acute bronchiolitis were recruited from eight h every second hour throughout the hospital st (20 mg/mL racemic epinephrine or 0·9% sali infant's weight: 0·10 mL, less than 5 kg; 0·1 dissolved in 2 mL of 0·9% saline before nebu follow-up study, 294 children were reinvestigat prick test for 17 allergens, determining bron subgroup analyses were d at ClinicalTrials.gov (number NCT00817466) a

did not differ betw developed recurren he presence of atopic

characteristics of the randomisation groups were simila

Racemic epinephrine d not show

. In the present study w were not able to identify relevant subgroups at the time acute bronchiolitis thus restricting the clinical applicabili of choosing individuals who would potentially bene from inhaled racemic epinephrine. We found significant treatment differences based on allergic disea risk at the time of hospital admission,[4] possibly becaus atopic eczema had not yet developed for most infants. Ou study does not support a trial of inhaled epinephrine children with increased risk of allergic diseases.

thmandu Univ Med J (KUMJ). 2016 Jan-Mar;14(53):31-35.

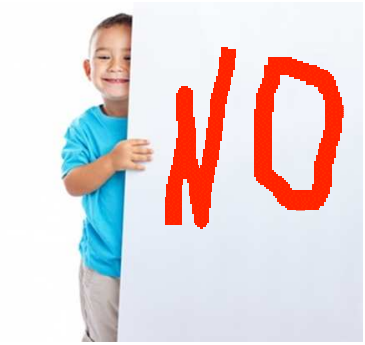
omparison of Initial Response of Nebulized Salbutamol and drenaline in Infants and young Children Admitted with Acute ronchiolitis.

lhikari S[1], Thapa P[2], Rao KS[1], Bk G[1].Department of Paediatrics, Manipal College of Medical ciences, Phulbari-11, Pokhara, Nepal.Department of Psychiatry, Manipal College of Medical ciences, Phulbari-11, Pokhara, Nepal.

ckground Acute bronchiolitis is common cause of hospitalization in infants and young ildren. There are widespread variations in the diagnosis and management. Despite the use of onchodilators for decades, there is lack of consensus for the benefit of one above another. jective To compare initial response of nebulized adrenaline and salbutamol. Method Children ed two months to two years admitted with acute bronchiolitis in the department of Paediatrics Manipal teaching hospital, Pokhara, Nepal, from 1st March 2014 to 28th February 2015 were rolled. Patients fulfilling inclusion criteria received either adrenaline or salbutamol bulization. Data were collected in a predesigned proforma. Respiratory distress assessment strument (RDAI) scores were considered primary outcome measure and respiratory rate at 48 urs, duration of hospital stay, requirement of supplemental oxygen and intravenous fluid were nsidered secondary outcome measure. Result A total of 40 patients were enrolled in each udy group. Mean RDAI scores at admission was in 9.75 with (CI- 9.01, 10.49) in adrenaline d 9.77 (CI- 9.05, 10.50) in salbutamol group. There was gradual decline in mean RDAI scores both the groups over 48 hours to 4.15 (CI- 3.57,4.73) and 4.13 (CI- 3.69,4.56) in adrenaline d salbutamol group respectively. Hospital stay was 5.32 days in adrenaline and 5.68 days in lbutamol group. Patients nebulized with adrenaline required oxygen for 33.30 hours mpared with 36.45 hours in salbutamol. Intravenous fluid duration was also less in adrenaline oup compared to salbutamol group (33.15 vs 37.80 hours). Conclusion Patients of acute onchiolitis nebulized with either salbutamol or adrenaline experienced similar decline in RDAI ores in the first 48 hours. Duration of supplementary oxygen and intravenous fluid was less in renaline group compared with salbutamol group.

Adhikari s y col. NEPAL 2016
SALBUTAMOL vs. ADRENALIN
Similar respuesta según score
PERO YA HABÍAMOS DICHO C
AGONISTAS β2 NO.
¡¿ENTONCES?!...

¿Y LA KINESIOTERAPIA?



COCHRANE 2016

Cochrane Library

Cochrane Database of Systematic Reviews

Chest physiotherapy for acute bronchiolitis in paediatric patients between 0 and 24 months old (Review)

Roqué i Figuls M, Giné-Garriga M, Granados Rugeles C, Perrotta C, Vilaró J

None of the chest physiotherapy techniques analysed in this review (conventional, slow passive expiratory techniques or forced expiratory techniques) h[illegible]. For these reasons, these techniques cannot be used as standard clinical practice for hospitalised patients with severe bronchiolitis. There is high quality evidence that forced expiratory techniques in severe patients do not improve their health status and can lead to severe adverse events. Slow passive expiratory techniques provide an immediate and transient relief in moderate patients without impact on duration. Future studies should test the potential effect of slow passive expiratory techniques in mild to moderate non-hospitalised patients and patients who are respiratory syncytial virus (RSV) positive. Also, they could explore the combination of chest physiotherapy with salbutamol or hypertonic saline.

Roqué i Figuls M, Giné-Garriga M, Granados Rugeles C, Perrotta C, Vilaró J.
Chest physiotherapy for acute bronchiolitis in paediatric patients between 0 and 24 months old.
Cochrane Database of Systematic Reviews 2016, Issue 2. Art. No.: CD004873.
DOI: 10.1002/14651858.CD004873.pub5.

www.cochranelibrary.com

WILEY

- ✓ **NO REDUCE LA SEVERIDAD DE LA ENFERMEDAD**

¿PROBAMOS CON CINa 3% NEBULIZADO?

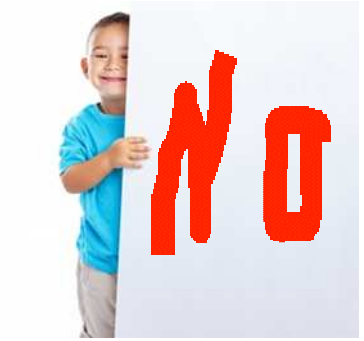
COCHRANE 2013

Cochrane Library

Cochrane Database of Systematic Reviews

Nebulised hypertonic saline solution for acute bronchiolitis in infants (Review)

Zhang L, Mendoza-Sassi RA, Wainwright C, Klassen TP



Current evidence suggests nebulised 3% saline n[redacted] and improve the clinical severity score in both outpatient and inpatient populations.

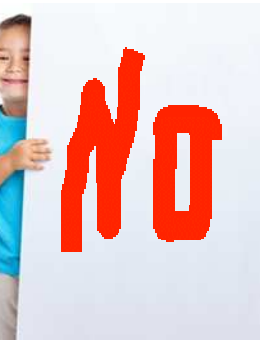
Zhang L, Mendoza-Sassi RA, Wainwright C, Klassen TP.
Nebulised hypertonic saline solution for acute bronchiolitis in infants.
Cochrane Database of Systematic Reviews 2013, Issue 7. Art. No.: CD006458.
DOI: 10.1002/14651858.CD006458.pub3.

www.cochranelibrary.com

WILEY

- ✓ **PODRÍA REDUCIR LA ESTANCIA EN CUADROS SEVEROS**

sa F y col.
NEZ, 2014.
la 5% CON Y SIN
RENALINA.
No es efectiva



Tunis Med. 2014 Nov;92(11):674-7.

A randomized, controlled trial of n[redacted] and mixed 5% hypertonic saline with epinephrine in bronchiolitis.

Tinsa F, Abdelkafi S, Bel Haj I, Hamouda S, Brini I, Zouari B, Boussetta K.

BACKGROUND: Bronchiolitis is a public health problem in the word and in Tunisia. Nebulized hypertonic saline seems to have some benefits in bronchiolitis. The aim of this study is to evaluate the efficacy of nebulized 5% hypertonic saline alone or mixed with epinephrine in bronchiolitis as measured by improvement in clinical score, oxygen saturation or reduction in duration of hospitalization.

METHODS: This prospective, double blind, placebo controlled, randomized clinical trial was performed at Children's Hospital of Tunis from February 2012 to Mars 2012. A total of 94 patients less than 12 months of age with diagnosis of moderately severe bronchiolitis were enrolled and assigned to receive 5% nebulized hypertonic saline, mixed 5% hypertonic saline with standard epinephrine 0,1% or normal saline (placebo) at admission and every 4 hours during hospitalization.

RESULTS: There were no significant difference between nebulized 5% hypertonic saline, mixed 5% hypertonic saline with epinephrine or normal saline at baseline, T30 min, T60 min, and T120 min after start study in Wang severity score, oxygen saturation in room air, rate respiratory and heart rate. There was no difference in duration of hospitalization.

CONCLUSION: Nebuliz[redacted] saline or mixed 5% hypertonic saline with epinephrine are safety but [redacted] in treating moderately ill infants with the first acute bronchiolitis.

Kose S y col. Turquía 2016. NO DISMINUYE LA ESTANCIA HOSPITALARIA

Balkan Med J 2016;33:193-7

Comparing the Efficacy of [redacted]% Saline in Moderate to Severe Bronchiolitis in Infants

Seçil Köse[1], Ahmet Şehriyaroğlu[1], Feyza Esen[1], Ahmet Özdemir[1], Zehra Kardaş[1], Umut Altuğ[1], Esef Karakuş[1], Alper Özcan[1], Ali Fatih Kısaarslan[1], Ferhan Elmalı[2], Yasemin Altuner Torun[1], Mehmet Köse[3]

[1]Department of Pediatrics, Kayseri Training and Research Hospital, Kayseri, Turkey
[2]Departments of Biostatistics and Bioinformatics, Erciyes University School of Medicine, Kayseri, Turkey
[3]Department of Pediatrics, Division of Pediatric Pulmonology Unit, Erciyes University School of Medicine, Kayseri, Turkey

Background: There is no standard treatment option in acute bronchiolitis. 3-7% hypertonic saline (HS) seems to be the effective treatment choice for reducing the hospitalization day.
Aims: To compare the effect of nebulized 7% HS/salbutamol and 3% HS/salbutamol to 0.9% saline/salbutamol. The primary outcome measure was the effect of study drugs on the length of hospital stay (LOS). Secondary outcome measures were safety and efficacy in reducing the clinical severity score (CSS) at the 24 hours of the study.
Study Design: Prospective, double-blinded randomized clinical study.
Methods: The study consists of 104 infants. Groups were constituted according to the treatment they received: These are, group A – 0.9% saline/salbutamol, group B -3% HS/salbutamol and group C-7% HS/salbutamol. Heart beat, Bronchiolitis CSS and oxygen saturation of the patients were determined before and after nebulization. The patients were monitored for adverse reactions.
Results: Length of hospital stay in group A, B and C were as follows; 72.0 (20-288) hours in group A, 64.0 (12-168) hours in group B and 60.0 (12-264) hours in group C. No significant differences was observed among three groups ($p>0.05$).
Conclusion [redacted]
Ke [redacted] Bronchiolitis, hypertonic saline, infant

Gupta H y col. INDIA 2016

Original Article

Effectiveness of 3% hypertonic saline nebulization in acute bronchiolitis among Indian children: A quasi-experimental study

Harsh V. Gupta, Vivek V. Gupta[1], Gurmeet Kaur, Amitoz S. Baidwan[2], Pardeep P. George[3], Jay C. Shah[4], Kushal Shinde[1], Ruku Malik[1], Neha Chitkara[5], Krushnan V. Bajaj[6]

Departments of Pediatrics, GGS Medical College and Hospital, Faridkot, Punjab, [1]Department of Public Health Dentistry, Pacific Dental College and Hospital, Udaipur, Rajasthan, [2]Department of Pediatrics, Chaitanya Hospital, Chandigarh, [3]Department of Orthodontics, AL Azhar Dental College and Hospital, Kerala, [4]Department of Oral and Maxillofacial Surgery, Government Dental College and Hospital, Ahmadabad, Gujarat, [5]Department of Oral Medicine and Radiology, Mahatma Gandhi Dental College and Hospital, Jaipur, Rajasthan, [6]Department of Prosthodontics, Pacific Dental College and Hospital, Udaipur, Rajasthan, India

Address for correspondence:
Dr. Harsh V. Gupta,
Department of Pediatrics, GGS Medical College and Hospital, Faridkot, Punjab, India.
E-mail: drharshvardhan83@gmail.com

Abstract

Objective: To compare the effects of 3% hypertonic saline (HS) and 0.9% normal saline with nebulized 0.9% normal saline with salbutamol in patients of acute viral bronchiolitis. **Materials and Methods:** Participants were divided into three groups, that is, 3% HS group, 0.9% normal saline group and 0.9% saline with salbutamol group. Four doses at interval of 6 h were given daily until discharge. Average CS score and length of hospital stay were compared. One-way analysis of variance paired *t*-test and Chi-square test were utilized for statistical analysis. **Results:** The mean ages of the patients in three groups were 6.03 ± 3.71, 5.69 ± 3.34 and 5.48 ± 3.35 respectively. [illegible] day CS scores for all the groups were 1.0 ± 1.1, [illegible] ± 0.5 respectively ($P = 0.000$). The average length of hospital stay was 3.4 ± 1.7, 3.7 ± 1.9 and 4.9 ± [illegible] days respectively ($P = 0.001$). **Conclusion:** The present study concludes that 3% HS nebulization (without additional bronchodilators) is an effective and safe treatment for nonasthmatic, moderately ill patients of acute bronchiolitis. The economic benefit of this comparably priced modality of treatment can be enormous in terms of hospital costs with parents returning to work sooner.

Key words: [illegible] saline, 0.9% saline with salbutamol, 3% [illegible] saline, acute bronchiolitis

Access this article online

Quick Response Code:

Website: www.picronline.org

DOI: 10.4103/2229-3485.179434

How to cite this article: Gupta HV, Gupta VV, Kaur G, Baidwan AS, George PP, Shah JC, *et al.* Effectiveness of 3% hypertonic saline nebulization in acute bronchiolitis among Indian children: A quasi-experimental study. Perspect Clin Res 2016;7:88-93.

Table 3: Comparison of CS scores before and 3 days after treatment

		Before treatment			After treatment		
Treatment	***n***	**Mean±SD**	***F***	***P***	**Mean±SD**	***F***	***P***
[illegible] saline (Group A)	33	5.9±1.5	1.96	0.146	1.0±1.1	49.463	0.000***
[illegible] (Group B)	33	5.1±2.3			1.9±1.1		
Salbutamol (Group C)	33	5.5±1.0			3.3±0.5		

***Highly significant. SD=Standard deviation, CS= Clinical severity score

Table 4: Length of hospital stay according to type of treatment in each group

	Length of hospital stay (days)			
Treatment	***n***	**Mean±SD**	***F***	***P***
[illegible]	[illegible]	[illegible]	7.77	0.001**
Salbutamol (Group C)	33	4.9±1.4		

**Significant. SD=Standard deviation

Research

Original Investigation

Association Between Hypertonic Saline and Hospital Length of Stay in Acute Viral Bronchiolitis
A Reanalysis of 2 Meta-analyses

Corinne G. Brooks, MD, MS; Wade N. Harrison, MPH; Shawn L. Ralston, MD, MS

IMPORTANCE Two previous meta-analyses of nebulized hypertonic saline (HS) on hospital length of stay (LOS) in acute viral bronchiolitis have suggested benefit. Neither study fully addressed the issue of excessive heterogeneity in the cohort of studies, indicating that it may be inappropriate to combine such dissimilar studies to estimate a common treatment effect.

OBJECTIVE To reanalyze the existing data set for sources of heterogeneity to delineate the population most likely to benefit from HS.

DATA SOURCES We used the previously analyzed cohort of randomized trials from 2 published meta-analyses comparing HS with normal saline (or, in 1 case, with standard of care) in infants hospitalized for bronchiolitis. We also repeated the search strategy used by the most recent Cochrane Review in the Medline database through September 2015.

STUDY SELECTION Eighteen randomized clinical trials of HS in infants with bronchiolitis reporting LOS as an outcome measure were included.

DATA EXTRACTION AND SYNTHESIS The guidelines used for abstracting data included LOS, study year, setting, sample size, type of control, admission/discharge criteria, adjunct medications, treatment frequency, mean day of illness at study enrollment, mean severity of illness scores, and mean age.

MAIN OUTCOMES AND MEASURES Weighted mean difference in LOS and study heterogeneity as measured by the I^2 statistic.

RESULTS There were 18 studies included of 2063 infants (63% male), with a mean age of 4.2 months. The mean LOS was 3.6 days. Two main sources of heterogeneity were identified. First, the effect of HS on LOS was entirely sensitive to the removal of one study population, noted to have a widely divergent definition of the primary outcome. Second, there was a baseline imbalance in mean day of illness at presentation between treatment groups. Controlling for either of these factors resolved the heterogeneity (I^2 = reduced from 78% to 45% and 0%, respectively) and produced summary estimates in support of the null hypothesis (that HS does not affect LOS). There was a weighted mean difference in LOS of −0.21 days (95% CI, −0.43 to +0.02) for the sensitivity analysis and +0.02 days (95% CI, −0.14 to +0.17) for studies without unbalanced treatment groups on presentation.

CONCLUSIONS AND RELEVANCE Prior analyses were driven by an outlier population and unbalanced treatment groups in positive trials. Once heterogeneity was accounted for, the data did not support the use of HS to decrease LOS in infants hospitalized with bronchiolitis.

Supplemental content at jamapediatrics.com

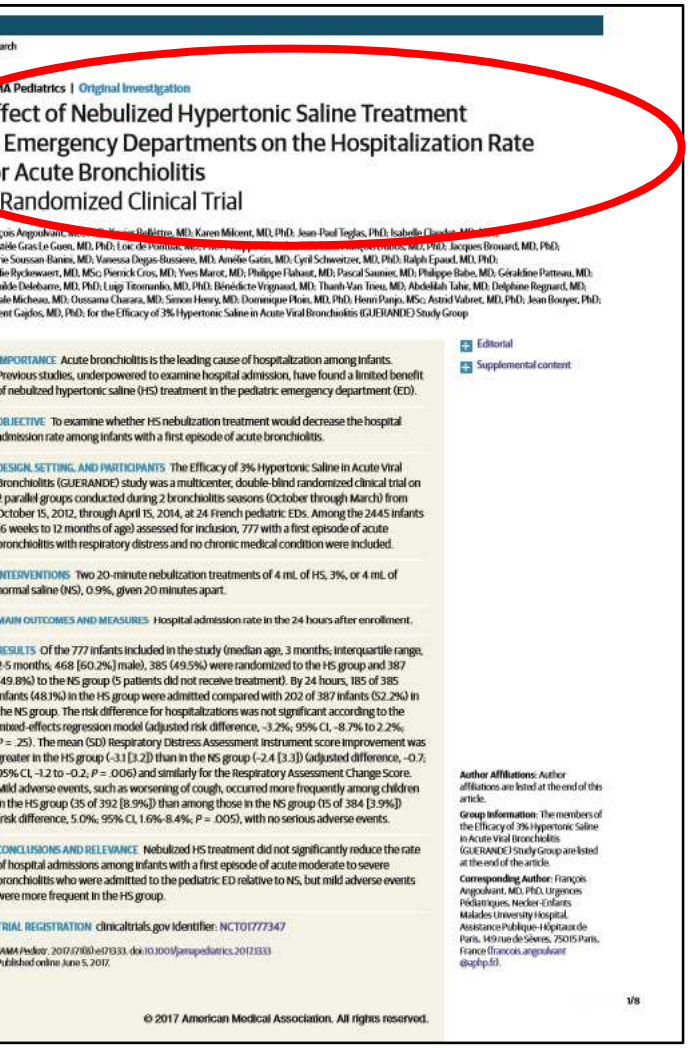
Author Affiliations: Leadership in Preventive Medicine and Pediatrics Residencies, Dartmouth-Hitchcock Medical Center, Lebanon, New Hampshire (Brooks); Geisel School of Medicine at Dartmouth, Hanover, New Hampshire (Harrison); Children's Hospital at Dartmouth-Hitchcock, Lebanon, New Hampshire (Ralston).

Corresponding Author: Shawn L. Ralston, MD, MS, Children's Hospital at Dartmouth, 1 Medical Dr, Lebanon, NH 03745 (shawn.l.ralston@dartmouth.edu).

JAMA Pediatr. doi:10.1001/jamapediatrics.2016.0079
Published online April 18, 2016.

Brooks C y col. JAMA 2016
✓ **NO DISMINUYE ESTANCIA**

The appearance of a meaningful summary treatment effect on LOS in the cohort of studies on HS in acute viral bronchiolitis is a result of inappropriately combining studies with meaningful differences in outcome definitions and previously unnoticed systematic bias in treatment group allocation.



JAMA Pediatrics | Original Investigation

ffect of Nebulized Hypertonic Saline Treatment Emergency Departments on the Hospitalization Rate r Acute Bronchiolitis Randomized Clinical Trial

[redacted] MD; Karen Milcent, MD, PhD; Jean-Paul Teglas, PhD; Isabelle [redacted]; [redacted] MD, PhD; Loic de Pontual, MD; [redacted] MD, PhD; Jacques Brouard, MD, PhD; [redacted] MD; Vanessa Degas-Bussiere, MD; Aurélie Gatin, MD; Cyril Schweitzer, MD, PhD; Ralph Epaud, MD, PhD; [redacted] MSc; Pierrick Cros, MD; Yves Marot, MD; Philippe Flahaut, MD; Pascal Saunier, MD; Philippe Babe, MD; Géraldine Patteau, MD; [redacted] MD, PhD; Luigi Titomanlio, MD, PhD; Bénédicte Vrignaud, MD; Thanh Van Treu, MD; Abdellah Tahir, MD; Delphine Regnard, MD; [redacted] MD; Oussama Charara, MD; Simon Henry, MD; Dominique Plois, MD, PhD; Henri Panjo, MSc; Astrid Vabret, MD, PhD; Jean Bouyer, PhD; [redacted] MD, PhD; for the Efficacy of 3% Hypertonic Saline in Acute Viral Bronchiolitis (GUERANDE) Study Group

Editorial

Supplemental content

IMPORTANCE Acute bronchiolitis is the leading cause of hospitalization among infants. Previous studies, underpowered to examine hospital admission, have found a limited benefit of nebulized hypertonic saline (HS) treatment in the pediatric emergency department (ED).

OBJECTIVE To examine whether HS nebulization treatment would decrease the hospital admission rate among infants with a first episode of acute bronchiolitis.

DESIGN, SETTING, AND PARTICIPANTS The Efficacy of 3% Hypertonic Saline in Acute Viral Bronchiolitis (GUERANDE) study was a multicenter, double-blind randomized clinical trial on parallel groups conducted during 2 bronchiolitis seasons (October through March) from October 15, 2012, through April 15, 2014, at 24 French pediatric EDs. Among the 2445 infants (6 weeks to 12 months of age) assessed for inclusion, 777 with a first episode of acute bronchiolitis with respiratory distress and no chronic medical condition were included.

INTERVENTIONS Two 20-minute nebulization treatments of 4 mL of HS, 3%, or 4 mL of normal saline (NS), 0.9%, given 20 minutes apart.

MAIN OUTCOMES AND MEASURES Hospital admission rate in the 24 hours after enrollment.

RESULTS Of the 777 infants included in the study (median age, 3 months; interquartile range, 1-5 months; 468 [60.2%] male), 385 (49.5%) were randomized to the HS group and 387 (49.8%) to the NS group (5 patients did not receive treatment). By 24 hours, 185 of 385 infants (48.1%) in the HS group were admitted compared with 202 of 387 infants (52.2%) in the NS group. The risk difference for hospitalizations was not significant according to the mixed-effects regression model (adjusted risk difference, −3.2%; 95% CI, −8.7% to 2.2%; $P = .25$). The mean (SD) Respiratory Distress Assessment Instrument score improvement was greater in the HS group (−3.1 [3.2]) than in the NS group (−2.4 [3.3]) (adjusted difference, −0.7; 95% CI, −1.2 to −0.2; $P = .006$) and similarly for the Respiratory Assessment Change Score. Mild adverse events, such as worsening of cough, occurred more frequently among children in the HS group (35 of 392 [8.9%]) than among those in the NS group (15 of 384 [3.9%]) (risk difference, 5.0%; 95% CI, 1.6%-8.4%; $P = .005$), with no serious adverse events.

CONCLUSIONS AND RELEVANCE Nebulized HS treatment did not significantly reduce the rate of hospital admissions among infants with a first episode of acute moderate to severe bronchiolitis who were admitted to the pediatric ED relative to NS, but mild adverse events were more frequent in the HS group.

TRIAL REGISTRATION clinicaltrials.gov Identifier: NCT01777347

JAMA Pediatr. 2017;171(8):e171333. doi:10.1001/jamapediatrics.2017.1333 Published online June 5, 2017.

Author Affiliations: Author affiliations are listed at the end of this article.

Group Information: The members of the Efficacy of 3% Hypertonic Saline in Acute Viral Bronchiolitis (GUERANDE) Study Group are listed at the end of the article.

Corresponding Author: François Angoulvant, MD, PhD, Urgences Pédiatriques, Necker-Enfants Malades University Hospital, Assistance Publique-Hôpitaux de Paris, 149 rue de Sèvres, 75015 Paris, France (francois.angoulvant@aphp.fr).

Table 2. Hospital Admission Rates by Hour 24 and Day 28[a]

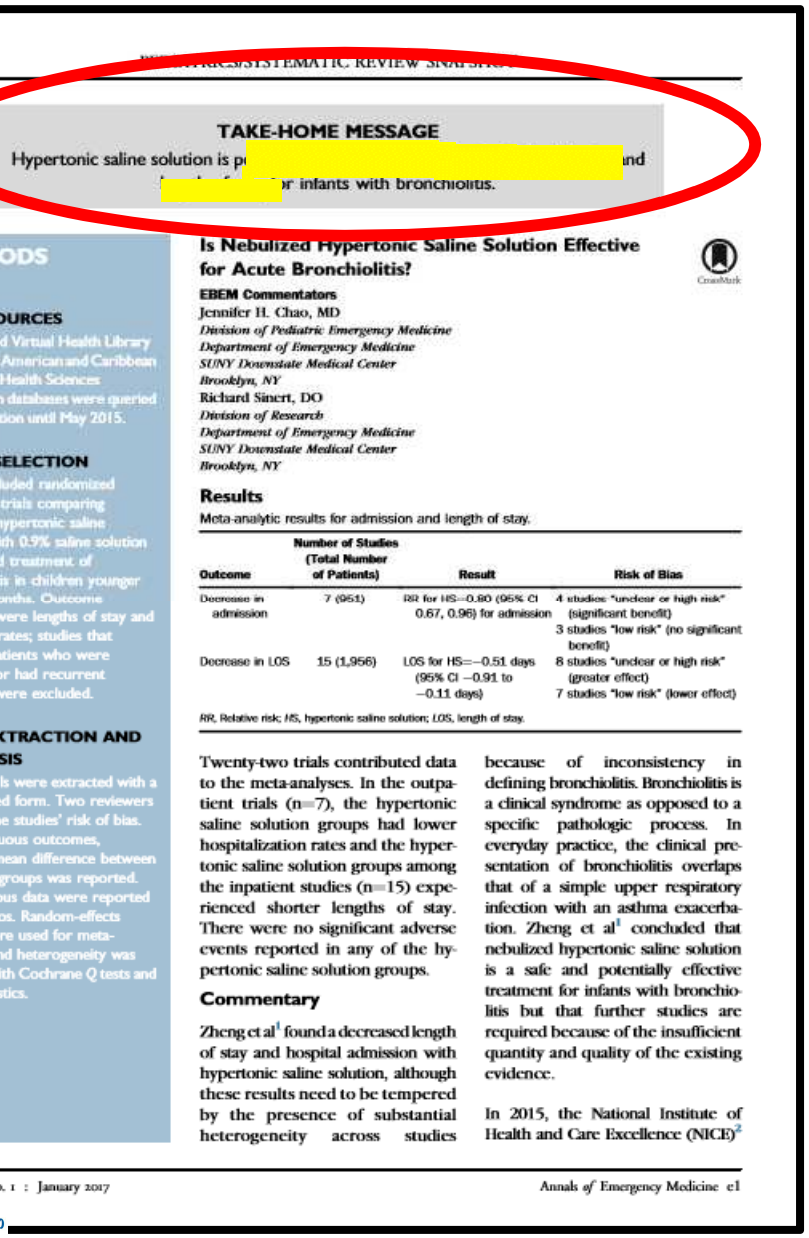
Characteristics	Hypertonic Saline Group (n = 385)	Normal Saline Group (n = 387)	Risk Difference, %[b] (95% CI)	P V
[redacted]	[redacted]	[redacted]	-3.2 (-8.7 to 2.2)	.25
Direct admission	169 (43.9)	188 (48.6)	-3.8 (-9.2 to 1.6)	.17
Secondary admission	16/216 (7.4)	14/199 (7.0)	0.1 (-3.1 to 5.1)	.63
Admission by day 28[c]	209/378 (55.3)	226/383 (59.0)	-2.7 (-8.7 to 3.3)	.37
Admission rate by age group				
<3 mo	121/221 (54.8)	132/230 (57.4)	-1.8 (-8.1 to 4.5)	.58
≥3 mo	64/164 (39.0)	70/157 (44.6)	-4.6 (-13.4 to 4.2)	.31
[redacted]	[redacted]	[redacted]	1.6 (-2.7 to 5.9)	.47
[redacted]0), d[d]	[redacted]	[redacted]	-0.1[e] (-0.6 to 0.4)	.71
RDAI score after nebulization, mean (SD)[f]	4.9 (3.2)	5.3 (3.4)	-0.5[e] (-0.9 to -0.1)	.02
Change in RDAI before and after nebulization, mean (SD)[g]	-3.1 (3.2)	-2.4 (3.3)	-0.7[e] (-1.2 to -0.2)	.00
RACS, mean (SD)[h]	-4.4 (4.9)	-3.4 (4.8)	-0.1[e] (-1.7 to -0.3)	.00

Conclusions

Although short-term improvements in the RDAI score and RACS were greater in the HS group, [redacted] Our study failed to demonstrate superiority of nebulized HS treatment compared with NS treatment in reducing the hospitalization rate of infa with acute bronchiolitis in the pediatric ED. Althoug serious adverse events occurred, mild adverse eve were more frequently experienced by infants in the group. The use of HS treatment for infants with a first sode [redacted] pediatric ED canno recor

JAMA 2017. Francia

- ✓ **NO REDUCE LA ADMISIÓN**
- ✓ **NO DISMINUYE EL INGRESO A UCI**
- ✓ **NO REDUCE LA ESTANCIA**



TAKE-HOME MESSAGE

Hypertonic saline solution is p[redacted]nd [redacted]r infants with bronchiolitis.

ODS

OURCES
d Virtual Health Library
American and Caribbean
Health Sciences
databases were queried
tion until May 2015.

ELECTION
luded randomized
trials comparing
ypertonic saline
th 0.9% saline solution
d treatment of
is in children younger
onths. Outcome
were lengths of stay and
rates; studies that
atients who were
r had recurrent
were excluded.

XTRACTION AND
SIS
ls were extracted with a
d form. Two reviewers
e studies' risk of bias.
uous outcomes,
ean difference between
groups was reported.
us data were reported
os. Random-effects
re used for meta-
d heterogeneity was
th Cochrane Q tests and
tics.

Is Nebulized Hypertonic Saline Solution Effective for Acute Bronchiolitis?

EBEM Commentators
Jennifer H. Chao, MD
Division of Pediatric Emergency Medicine
Department of Emergency Medicine
SUNY Downstate Medical Center
Brooklyn, NY
Richard Sinert, DO
Division of Research
Department of Emergency Medicine
SUNY Downstate Medical Center
Brooklyn, NY

Results

Meta-analytic results for admission and length of stay.

Outcome	Number of Studies (Total Number of Patients)	Result	Risk of Bias
Decrease in admission	7 (951)	RR for HS=0.80 (95% CI 0.67, 0.96) for admission	4 studies "unclear or high risk" (significant benefit) 3 studies "low risk" (no significant benefit)
Decrease in LOS	15 (1,956)	LOS for HS=−0.51 days (95% CI −0.91 to −0.11 days)	8 studies "unclear or high risk" (greater effect) 7 studies "low risk" (lower effect)

RR, Relative risk; *HS*, hypertonic saline solution; *LOS*, length of stay.

Twenty-two trials contributed data to the meta-analyses. In the outpatient trials (n=7), the hypertonic saline solution groups had lower hospitalization rates and the hypertonic saline solution groups among the inpatient studies (n=15) experienced shorter lengths of stay. There were no significant adverse events reported in any of the hypertonic saline solution groups.

Commentary

Zheng et al[1] found a decreased length of stay and hospital admission with hypertonic saline solution, although these results need to be tempered by the presence of substantial heterogeneity across studies because of inconsistency in defining bronchiolitis. Bronchiolitis is a clinical syndrome as opposed to a specific pathologic process. In everyday practice, the clinical presentation of bronchiolitis overlaps that of a simple upper respiratory infection with an asthma exacerbation. Zheng et al[1] concluded that nebulized hypertonic saline solution is a safe and potentially effective treatment for infants with bronchiolitis but that further studies are required because of the insufficient quantity and quality of the existing evidence.

In 2015, the National Institute of Health and Care Excellence (NICE)[2]

ANNALS OF EMERGENCY MEDICINE. 2017

✓ **Se necesitan más estudios**

Both systematic reviews emphasized that the majority of studies demonstrating a larger effect for hypertonic saline solution compared with 0.9% saline solution were of high or uncertain risk of biases. In summary, the evidence for the use of hypertonic saline solution in bronchiolitis is evolving, and [redacted] focused on emergency department–relevant outcomes to provide guidance for emergency physicians.

¿QUÉ PASA CON EL HELIO?

COCHRANE 2015

- ✓ **No disminuye la tasa de intubación**
- ✓ **No disminuye la duración del taratmiento**

Cochrane Library

Cochrane Database of Systematic Reviews

Heliox inhalation therapy for bronchiolitis in infants (Review)

Liet JM, Ducruet T, Gupta V, Cambonie G

Current evidence suggests that the addition of heliox therapy may significantly reduce a clinical score evaluating respiratory di
in the first hour after starting treatment in infants with acute RSV bronchiolitis. We noticed this beneficial effect regardless of v
heliox inhalation protocol was used. Nevertheless, there was r
Heliox could reduce the length of treatment in infants requiring C
for sev ratory distress. Further studies with homogeneous logistics in their heliox application are needed. Inclusion criteria
include a clinical severity score that reflects severe respiratory distress to avoid inclusion of children with mild bronchiolitis who
not benefit from heliox inhalation. Such studies would provide the necessary information as to the appropriate place for heliox i
therapeutic schedule for severe bronchiolitis.

Liet JM, Ducruet T, Gupta V, Cambonie G.
Heliox inhalation therapy for bronchiolitis in infants.
Cochrane Database of Systematic Reviews 2015, Issue 9. Art. No.: CD006915.
DOI: 10.1002/14651858.CD006915.pub3.

www.cochranelibrary.com

WILEY

¿QUÉ MÁS?

...TENGANME PACIENCIA...

¿Sulfato de Magnesio?

Sulfato de Magnesio IV

Chest. 2017 Jul;152(1):113-119.

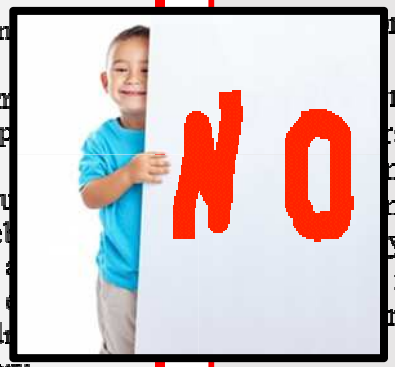
IV Magnesium Sulfate for Bronchiolitis: A Randomized Trial.

Alansari K[1], Sayyed R[2], Davidson BL[3], Al Jawala S[2], Ghadier M[2].

1Division of Pediatric Emergency Medicine, Department of Pediatrics, Hamad Medical Corporation, Doha, Qatar; Weill Cornell Medical College, Doha, Qatar; Division of Pediatric Emergency Medicine, Department of Pediatrics, Sidra Medical and Research Center, Doha, Qatar. Electronic address: dkmaa@hotmail.com.

2Division of Pediatric Emergency Medicine, Department of Pediatrics, Hamad Medical Corporation, Doha, Qatar.

3Pulmonary and Critical Care Medicine Division, University of Washington Medicine, Seattle, WA.



BACKGROUND: The goal of this study was to determine if IV magnesium severe pediatric asthma, reduces time to medical readiness for discharge in p bronchiolitis when added to supportive care.

METHODS: We compared a single dose of 100 mg kg of IV magnesium su placebo for acute bronchiolitis. Patients received bronchodilator therapy, nel hypertonic saline, and 5 days of dexamethasone if there was eczema and or a history of asthma. Time to medical readiness for discharge was the primary outcome. Bronchiolitis severity scores and need for infirmary or hospital adm for clinic revisits within 2 weeks were secondary outcomes. Cardiorespiratory instability onset was the safety outcome.

RESULTS: A total of 162 previously healthy infants diagnosed with bronchiolitis aged 22 days to 17.6 months (median, 3.7 months) were enrolled. Approximately one-half of patients had eczema and or a family history of asthma; 86.4% had positive findings on nasopharyngeal virus swabs. Geometric mean time until medical readiness for discharge was 24.1 h (95% CI, 20.0-29.1) for the 78 magnesium-treated patients and 25.3 h (95% CI, 20.3-31.5) for the 82 patients receiving placebo (ratio, 0.95 [95% CI, 0.52-1.80]; P = .91). Mean bronchiolitis severity scores over time were similar for the two groups. The frequency of clinic visits in the subsequent 2 weeks (33.8% and 27.2%, respectively) was also similar. Fifteen magnesium recipients (19.5%) vs five placebo recipients (6.2%) were readmitted to the infirmary or hospital within 2 weeks (P = .016). No acute cardiorespiratory side effects were reported.

CONCLUSIONS: IV magnesium [illegible] for patients with acute bronchiolitis and may be harmful.

Sulfato de Magnesio nebulizado

Indian J Pediatr. 2015 Sep;82(9):794-8.

Nebulized Magnesium Sulfate in Acute Bronchiolitis: A Randomized Controlled Trial.

Modaresi MR[1], Faghihinia J, Kelishadi R, Reisi M, Mirlohi S, Pajhang F, Sadeghian M

1Department of Pediatric Pulmonology, Child Growth and Development Research Center, Research Institute for Primordial Prevention of Non-Communicable Disease, Isfahan University of Medical Sciences, Isfahan, Iran.

OBJECTIVE: To assess the efficacy of nebulized magnesium sulfate as a r in infants hospitalized with acute bronchiolitis.

This three-center double masked randomized clinical trial comprised 120 moderate to severe bronchiolitis. They were randomly assigned into two rst group was treated with nebulized magnesium sulfate (40 mg/kg) and nephrine (0.1 ml/kg) and the second group (control) was treated with nephrine (0.1 ml/kg). The primary outcome was the length of hospital stay ygen, temperature, oxygen saturation (SPO2), pulse rate (PR), respiratory respiratory distress assessment instrument (RDAI) score were measured ng of the study and during hospitalization.

RESULTS: The mean (SD) age of 120 infants was 5.1(± 2.6) mo and 60% were boys. The length of hospital stay was not different between the two groups (P > 0.01). Use of oxygen supplementation, SPO2 and vital signs were similar in [illegible] groups. Improvement in RDAI score was significantly better in infan[illegible] treate[illegible] with nebulized magnesium sulfate than in the other group (P 0.01).

CONCLUSIONS: Thus, in infants with acute bronchiolitis, t[illegible]ect of nebulized magnesium sul[illegible]fate is [illegible]e. How[illegible]er nebulized magnesium sul[illegible]fate can improve the clinical score so it may have [illegible]ditive effect to reduce sympto[illegible]s during hospitalization.

Cochrane Library

Cochrane Database of Systematic Reviews

ebulised deoxyribonuclease for viral bronchiolitis in children ounger than 24 months (Review)

riquez A, Chu IW, Mellis C, Lin WY

iquez A, Chu IW, Mellis C, Lin WY.
ulised deoxyribonuclease for viral bronchiolitis in children younger than 24 months.
hrane Database of Systematic Reviews 2012, Issue 11. Art. No.: CD008395.
: 10.1002/14651858.CD008395.pub2.

w.cochranelibrary.com

lts based on the three included studies in this review did the use of nebulised rhDNase in children under 24 f age hospitalised with acute bronchiolitis. In these patients, treatment did not shorten the length of hospitalisation or improve utcomes. It might have a role in severe bronchiolitis complicated by atelectasis, but further clinical studies would need to be d.

The current evidence does not allow definitive conclusions to be made about the effects of leukotriene inhibitors on length of stay and clinical severity score in infants and young children with bronchiolitis. The q (unexplained high levels of statistical heterogeneity) and imprecision arising from small sample sizes and wide confidence which did not rule out a null effect or harm. Data on symptom-free days and incidence of recurrent wheezing were from singl only. Further large studies are required. We identified one registered ongoing study, which may make a contribution in the u this review.

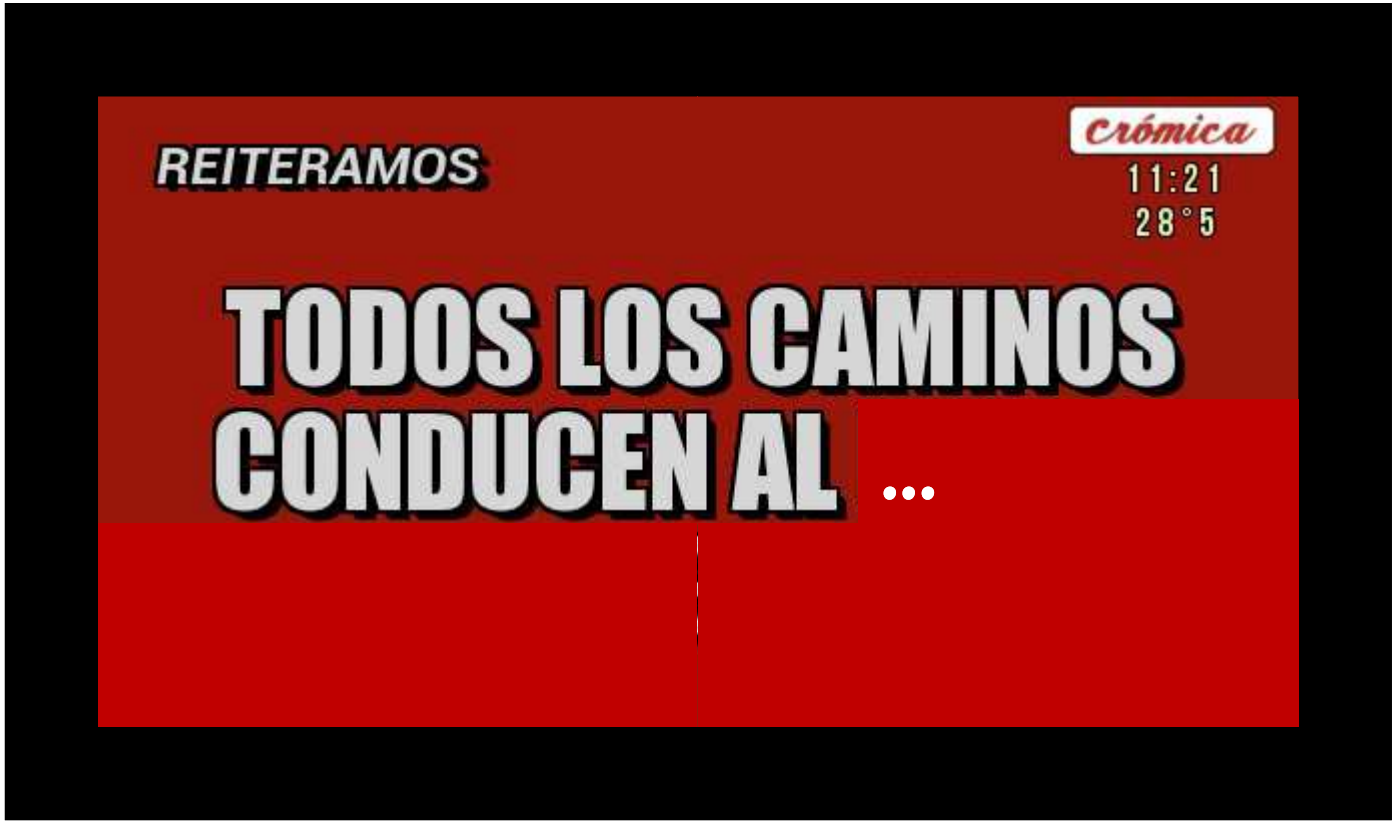
Leukotriene inhibitors for bronchiolitis in infants and your children (Review)

Liu F, Ouyang J, Sharma AN, Liu S, Yang B, Xiong W, Xu R

Liu F, Ouyang J, Sharma AN, Liu S, Yang B, Xiong W, Xu R.
Leukotriene inhibitors for bronchiolitis in infants and young children.
Cochrane Database of Systematic Reviews 2015, Issue 3. Art. No.: CD010636.
DOI: 10.1002/14651858.CD010636.pub2.

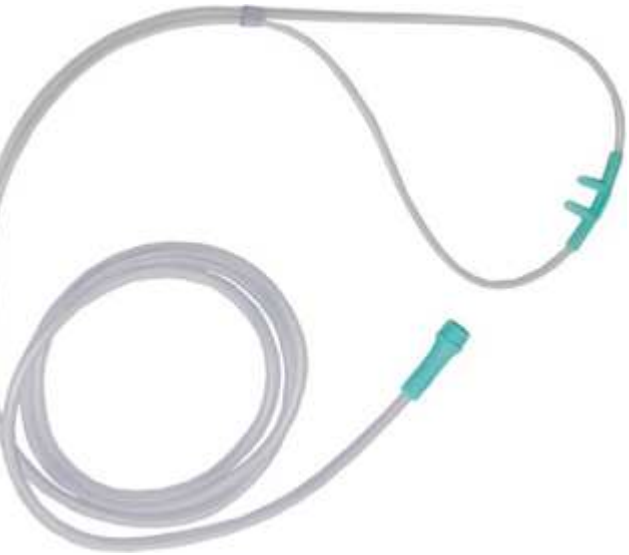
www.cochranelibrary.com

Volvemos al principio…
¿POR DÓNDE ARRANCAMOS?


REITERAMOS
crómica
11:21
28°5
TODOS LOS CAMINOS
CONDUCEN AL ...

OXÍGENO

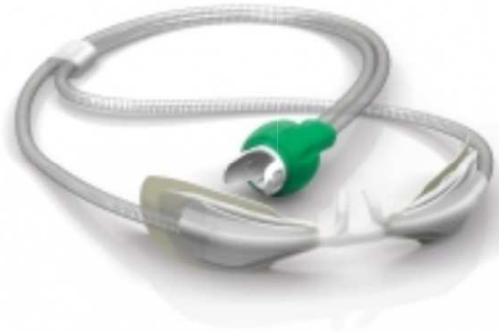
SOPORTE RESPIRATORIO EN EMERGENCIAS



OPORTUNIDAD

Hace algunos años aparecen…

CÁNULAS DE ALTO FLUJO DE OXÍGENO



¿O_2 ó Flujo?

¿CUÁL *SERÍA* LA VENTAJA FUNDAMENTAL?

- **Podría reducir la necesidad de soporte respiratorio mecánico**

✓ **ventajas clínicas**

✓ **menos efectos adversos**

✓ **menos costos económicos**

- Se plantea además que podría disminuir la cantidad de días de administración de O_2 y la estancia hospitalaria

Pero…
¿POR QUÉ EL APORTE DE LA MEZCLA DE AIRE Y OXÍGENO A TRAVÉS DE $CNAFO_2$ PUEDE SER SUPERIOR A LA TERAPIA ESTÁNDAR?

ECANISMOS PROPUESTOS

- El gas calentado y humidificado **podría reducir el daño a la mucosa de las vías respiratorias superiores** evitando así las reacciones nflamatorias y la broncoconstricción refleja inducida por el aire frío y seco.
- ***Lavado* del espacio muerto** nasofaríngeo, que resulta en una mejor ventilación alveolar y una mayor fracción de volumen minuto**.**
- **Reducción de la resistencia** de las vías respiratorias superiores, que constituye el 50% de la resistencia**.**
- **Un grado de presión positiva continua en las vías respiratorias (CPAP)**, que contribuiría a mejorar la ventilación.
- La humidificación y el calefaccionamiento del **gas produciría efecto beneficioso sobre la actividad ciliar y posiblemente disminuiría la viscosidad de las secreciones.**
- **Reduce el trabajo metabólico** asociado al acondicionamiento del gas en a nasofaringe

COCHRANE 2014
Falta evidencia

Cochrane Library

Cochrane Database of Systematic Reviews

High-flow nasal cannula therapy for infants with bronchiolitis (Review)

Beggs S, Wong ZH, Kaul S, Ogden KJ, Walters JAE

ere is insufficient evidence to determine the effectiveness of HFNC therapy for treating infants with bronchiolitis. The curren
dence in this review is of low quality, from one small study with uncertainty about the estimates of effect and an unclear risk o
rformance and detection bias. The included study provides some indication that HFNC therapy is feasible and well tolerated. Furthe
earch is required to determine the role of HFNC in the management of bronchiolitis in infants. The results of the ongoing studie
ntified will contribute to the evidence in future updates of this review.

Beggs S, Wong ZH, Kaul S, Ogden KJ, Walters JAE.
High-flow nasal cannula therapy for infants with bronchiolitis.
Cochrane Database of Systematic Reviews 2014, Issue 1. Art. No.: CD009609.
DOI: 10.1002/14651858.CD009609.pub2.

www.cochranelibrary.com

WILEY

Mikalsen et al. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine (2016) 24:93
DOI 10.1186/s13049-016-0278-4

Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine

REVIEW Open Access

High flow nasal cannula in children: a literature review

Ingvild Bruun Mikalsen[1,2*], Peter Davis[3] and Knut Øymar[1,2]

Abstract

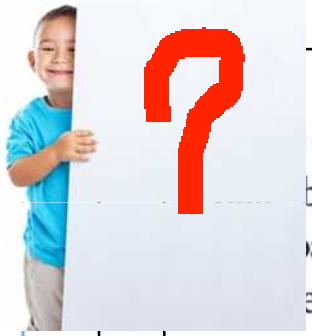
High flow nasal cannula (HFNC) is a relatively new non-invasive ventilation therapy that seems to be well tolerated in children. Recently a marked increase in the use of HFNC has been seen both in paediatric and adult care settings. The aim of this study was to review the current knowledge of HFNC regarding mechanisms of action, safety, clinical effects and tolerance in children beyond the newborn period.

We performed a systematic search of the databases PubMed, Medline, EMBASE and Cochrane up to 12th [illegible] 2016. Twenty-six clinical studies including children on HFNC beyond the newborn period with various resp diseases hospitalised in an emergency department, paediatric intensive care unit or general ward were inc Five of these studies were interventional studies and 21 were observational studies. Thirteen studies includ children with bronchiolitis, while the other studies included children with various respiratory conditions. Si including infants hospitalised in a neonatal ward, or adults over 18 years of age, as well as expert reviews, systematically evaluated, but discussed if appropriate.

The available studies suggest that HFNC is a relatively safe, well-tolerated and feasible method for deliveri oxygen to children with few adverse events having been reported. Different mechanisms including washo nasopharyngeal dead space, increased pulmonary compliance and some degree of distending airway pres be responsible for the effect. A positive clinical effect on various respiratory parameters has been observed studies suggest that HFNC may reduce the work of breathing. Studies including children beyond the new period have found that HFNC may reduce the need of continuous positive airway pressure (CPAP) and in ventilation, but these studies are observational and have a low level of evidence. There are no internation guidelines regarding flow rates and the optimal maximal flow for HFNC is not known, but few studies hav flow rate higher than 10 L/min for infants.

Until more evidence from randomized studies is available, HFNC may be used as a supplementary form of respiratory support in children, but with a critical approach regarding effect and safety, particularly when operated outside of a paediatric intensive care unit.

Keywords: High flow nasal cannula, Child, Mechanisms, Flow, Pressure, Effect, Ventilation, Side effect, Tolerance



Background

High flow nasal cannula (HFNC) oxygen delivery, also sometimes called heated humidified high flow nasal cannula (HHHFNC), is a relatively new non-invasive ventilation therapy that seems to be well tolerated in neonates and adults with hypoxemic respiratory failure [1–3]. Before the introduction of HFNC, traditionally a maximum flow of 0.5–1 L/min for delivery of oxygen by nasal cannula was set in newborns [4, 5] and a maximum flow of 2 L/min was used for older children and adults in order to prevent drying and discomfort of the nasal mucosa and other nasal mucosal complications [6]. High flow is usually defined as flow rate ≥2 L/min, the flow rate depending on the type of cannula used, but ranging from 4 to 70 L/min [7]. Debate is ongoing as to whether HFNC may reduce the use of less tolerated and more invasive ventilator supports, such as continuous positive airway pressure (CPAP) and mechanical ventilation.

* Correspondence: mil@sus.no
[1]Department of Paediatrics, Stavanger University Hospital, P.O. Box 8100, N-4068, Stavanger, Norway
[2]Department of Clinical Science, University of Bergen, Bergen, Norway
Full list of author information is available at the end of the article

Most of the clinical studies in children have been observational studies conducted in infants with bronchiolitis. A positive clinical effect on various respiratory parameters has been detected, and studies suggest that HFNC may reduce the work of breathing. HFNC may also decrease the need of CPAP and invasive ventilation in infants and children. RCTs performed in preterm infants and adults suggest that HFNC may be as effective as CPAP following extubation,

in children who have undergone cardiac surgery it been found to improve oxygenation in the post- ation period, when compared to low flow oxygen. ere are no international guidelines regarding flow rates, and the varying flow rates used in the clinical studies described in this paper, may explain the different results regarding effect. RCTs of HFNC including children beyond the newborn period are currently ongoing [58]. Until more evidence is available, HFNC may be used as a supplementary form of respiratory support in infants and children, but with a critical approach regarding effect clinical re sponses and ety issues relati [illegible]

Ojo

CET 2017
eotes E y col.
ralia.
o reduce la
stancia
odría tener
n rol como
erapia de
escate

High-flow warm humidified oxygen versus standard low-flow nasal cannula oxygen for moderate bronchiolitis (HFWHO RCT): an open, phase 4, randomised controlled trial

Elizabeth Kepreotes, Bruce Whitehead, John Attia, Christopher Oldmeadow, Adam Collison, Andrew Searles, Bernadette Goddard, Jodi Hilton, Mark Lee, Joerg Mattes

; 369: 930–39
Published Online February 1, 2017 http://dx.doi.org/10.1016/S0140-6736(17)30061-2
See Comment page 886

John Hunter Children's Hospital, Newcastle, NSW, Australia (E Kepreotes PhD, B Whitehead MD, B Goddard MAM, J Hilton BMed, M Lee BMed, Prof J Mattes PhD); Priority Research Centre GrowUpWell (E Kepreotes, A Collison PhD, Prof J Mattes) and Faculty of Health (E Kepreotes, B Whitehead, Prof J Attia MD, C Oldmeadow PhD, A Collison, A Searles PhD, B Goddard, J Hilton, M Lee, Prof J Mattes), University of Newcastle, Newcastle, NSW, Australia; John Hunter Hospital, Newcastle, NSW, Australia (Prof J Attia, C Oldmeadow, M Lee); and Hunter Medical Research Institute, Newcastle, NSW, Australia (E Kepreotes, Prof J Attia, C Oldmeadow,

Summary

Background Bronchiolitis is the most common lung infection in infants and treatment focuses on management of respiratory distress and hypoxia. High-flow warm humidified oxygen (HFWHO) is increasingly used, but has not been rigorously studied in randomised trials. We aimed to examine whether HFWHO provided enhanced respiratory support, thereby shortening time to weaning off oxygen.

Methods In this open, phase 4, randomised controlled trial, we [redacted] children aged less than 24 months with [redacted] attending the emergency department of the John Hunter Hospital or the medical unit of the John Hunter Children's Hospital in New South Wales, Australia. Patients were randomly allocated (1:1) via opaque sealed envelopes to HFWHO (maximum flow of 1 L/kg per min to a limit of 20 L/min using 1:1 air–oxygen ratio, resulting in a maximum FiO_2 of 0·6) or standard therapy (cold wall oxygen 100% via infant nasal cannulae at low flow to a maximum of 2 L/min) using a block size of four and stratifying for gestational age at birth. The primary outcome was time from randomisation to last use of oxygen therapy. All randomised children were included in the primary and secondary safety analyses. This trial is registered with the Australian New Zealand Clinical Trials Registry, number ACTRN12612000685819.

Findings From July 16, 2012, to May 1, 2015, we randomly assigned 202 children to either HFWHO (101 children) or standard therapy (101 children). Median time to weaning was 24 h (95% CI 18–28) for standard therapy and 20 h (95% CI 17–34) for HFWHO (hazard ratio [HR] for difference in survival distributions 0·9 [95% CI 0·7–1·2]; log rank p=0·61). Fewer children experienced treatment failure on HFWHO (14 [14%]) compared with standard therapy (33 [33%]; p=0·0016); of these children, those on HFWHO were supported for longer than were those on standard therapy before treatment failure (HR 0·3; 95% CI 0·2–0·6; p<0·0001). 20 (61%) of 33 children who experienced treatment failure on standard therapy were rescued with HFWHO. 12 (12%) of children on standard therapy required transfer to the intensive care unit compared with 14 (14%) of those on HFWHO (difference –1%; 95% CI –7 to 16; p=0·41). Four adverse events occurred (oxygen desaturation and condensation inhalation in the HFWHO group, and two incidences of oxygen tubing disconnection in the standard therapy group); none resulted in withdrawal from the trial. No oxygen-related serious

Interpretation HFWHO did [redacted] significantly [redacted] compared with standard therapy, suggesting that early use of HFWHO does not modify the underlying disease process [redacted]s. HFWHO m[redacted] to reduce the proportion of children requiring high-cost intensive care.

Arch Pediatr Urug 2016; 87(2):87-94

ARTÍCULO ORIGINAL

Impacto de la implementación de oxigenoterapia de alto flujo en el manejo de la insuficiencia respiratoria por infecciones respiratorias agudas bajas en un departamento de emergencia pediátrica

Impact of high flow nasal cannula oxygen in the management of acute respiratory failure in a Pediatric Emergency Department

Fabiana Morosini[1], Patricia Dall'Orso[2], Miguel Alegretti[3], Bernardo Alonso[4], Sebastian Rocha[5], Alejandra Cedrés[5], Mariana Más[4], Graciela Schabiague[6], Javier Prego[7]

Resumen

Introducción: *la oxigenoterapia de alto flujo (OAF) administrada por cánulas nasales, se ha instaurado como una técnica sencilla, fácil de administrar, de bajo costo, sin complicaciones graves, efectiva para el tratamiento de la insuficiencia respiratoria (IR) en infecciones respiratorias agudas bajas (IRAB). Su aplicación temprana podría mejorar la evolución de estos niños.*

Objetivos: *comunicar la primera experiencia con OAF en niños con IRAB en un Departamento de Emergencia Pediátrica (DEP). Compararla con una cohorte histórica de niños que no la recibió.*

Métodos: *estudio descriptivo, prospectivo (1 de junio de 2013-20 de setiembre de 2013). Todos los niños tratados con OAF en DEP del Centro Hospitalario Pereira Rossell. Criterios de inclusión: <2 años con IRAB viral con IR y escore de Tal >8 o ≥7 mantenido, apneas reiteradas, saturación de oxígeno <90% con O_2 por máscara de flujo libre. Criterios de exclusión: pCO_2 >70 mmHg, pH <7,2, depresión de conciencia, falla hemodinámica.*

Resultados: *OAF 36 niños; mediana 4 meses; bronquiolitis 83%; VRS+ 58%. Destino pacientes en OAF: cuidados moderados 78%, UCI 22%, AVM 22%. No complicaciones ni fallecimientos. Cohorte histórica: 91 niños con IRAB no tratados con OAF. Cohorte histórica: UCI: 40 (44%) versus OAF (p=0,0005). AVM: cohorte histórica 30 (33%) versus OAF (p=0,026). Menores 6 meses: con OAF AVM 5 (19%), cohorte histórica: 25(45%) (p=0,026).*

Conclusiones: *en un porcentaje elevado de pacientes fue posible evitar el ingreso a UCI. La necesidad de AVM en menores de 6 meses con OAF fue significativamente menor. La incorporación temprana de OAF en las IRAB graves modificó la forma de tratamiento de estos pacientes en la emergencia.*

1. Asistente. Depto. Emergencia Pediátrica. Facultad de Medicina. UDE
2. Prof. Agda. Depto. Emergencia Pediátrica. Facultad de Medicina. UD
3. Prof. Adj. Depto. Métodos Cuantitativos. Facultad de Medicina. UDEL
4. Prof. Adj. Depto. Emergencia Pediátrica. Facultad de Medicina. UDEL
5. Ex Asistente. Depto. Emergencia Pediátrica. Facultad de Medicina. U
6. Jefe. Depto. Emergencia Pediátrica. UDELAR. HP-CHPR. ASSE
7. Prof. Titular. Depto. Emergencia Pediátrica. Facultad de Medicina. UD
Depto. Emergencia Pediátrica. UDELAR. HP-CHPR. ASSE.
Trabajo inédito.
Declaramos no tener conflictos de intereses.
Fecha recibido: 25 de setiembre de 2015.
Fecha aprobado: 19 de febrero de 2016.

Tabla 2. Requerimiento de AVM en niños menores de 6 meses según tratamiento con OAF.

	Sí	No	Total
	5 (19%)		26 (100%)
	25 (45%)		56 (100%)

p= 0,026. Test Chi-cuadrado

Morosini y col. Uruguay 2016

✓ **Disminuye la AVM**

Hospital de Niños Santísima Trinidad Córdoba
Servicio de Emergencias

Período: 1/06 al 21/09/2017

N: 181

Diagnóstico de bronquiolitis: 60% (108)

Edad, en meses: 6

No requirieron Ventilación Mecánica: 67% (121)

Eficiencia y seguridad en el Uso de Cánulas Nasales de Alto Flujo en el Tratamiento de Pacientes con Bronquiolitis en una Unidad de Cuidados Neonatales

Pallarola A, Bellani P, De Luca P, Otaño J, Mugas A, Fariña D. Servicios de Kinesiología y Neonatología. Hospital de Pediatría Prof. Dr. J. P. Garrahan. 3er Congreso Argentino de Neonatología.

Hospital de Pediatría Garrahan

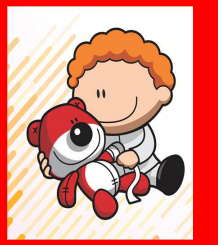
CNAF N=23, 78% no requirieron VNI o IOT/ARM

Periodo	BQL	ARM	%
2012-2013	219	30*	15
2015	106	8*	7

Disminución del 46% de ARM

$CNAFO_2$

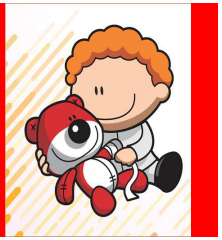
Unidad Emergencias
Hospital de Pediatría Prof. Dr. Juan P. Garrahan
2017



- Edad < 24 meses
- Diagnóstico de bronquiolitis
- Score de Tal modificado ≥ 7 y/o saturometría de O_2< 90% y/o requerimiento de flujo de O_2 > 2 L/minuto por cánula nasal común
- No ingresan: CRIA, Depresión del sensorio, Inestabilidad hemodinámica, Atresia de coanas, Obstrucción de la vía aérea superior, Sospecha o confirmación de cuerpo extraño en vía aérea, Malformaciones craneofaciales, trauma facial o cirugías de la nasofaringe que impida la utilización de la técnica de la misma manera que a los otros pacientes, Neumotórax, Enfermedad pulmonar crónica, Necesidad de asistencia respiratoria mecánica invasiva o no invasiva, Cualquier otra condición clínica no planteada previamente y que no haya sido discutida por el equipo médico tratante

$CNAFO_2$

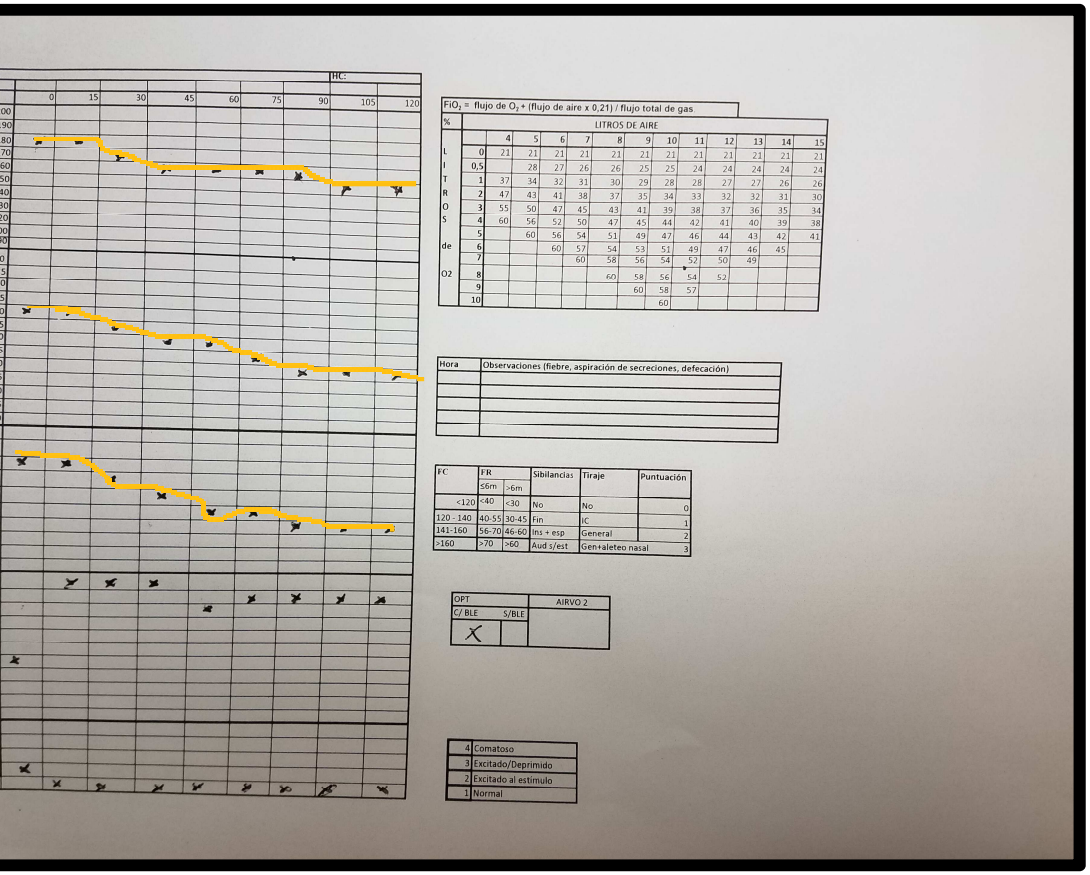
Unidad Emergencias
Hospital de Pediatría Prof. Dr. Juan P. Garrahan
2017



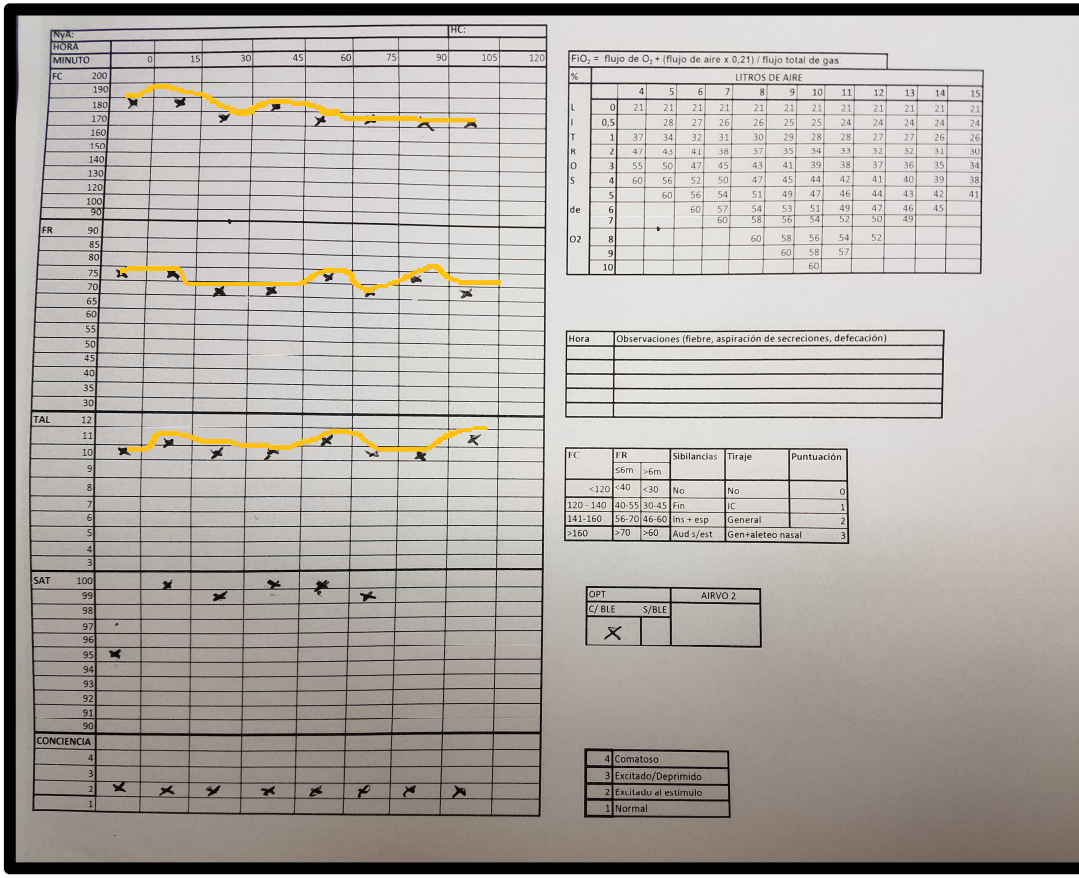
- **Flujo** = 2 L/kg/min
- **FiO_2** inicial = 0,6
- **Evaluación** de respuesta: 120´
- ***No respondedor:*** Dentro de los 120´ no disminuye esfuerzo respiratorio (Score de Tal modificado), FR y FC, y no mejora la saturometría de O_2 dentro de ese período.
- ***Respondedor:*** Disminuye el esfuerzo respiratorio, FR y FC (descenso de Score de Tal modificado y FR en un 20% o alcanza valores normales)
- **Saturometría** de O_2: 94-98%
- **Sedación** farmacológica: No
- **Alimentación**: Si, se podría alimentar por sonda nasogástrica o succión según el esfuerzo respiratorio, valorando la tolerancia y distensión gástrica.
- **Traslado**
- **No demorar la implementación de VNI o ARM si el paciente así lo requiriese.**

ONTROL DE EVOLUCIÓN

SPONDEDOR

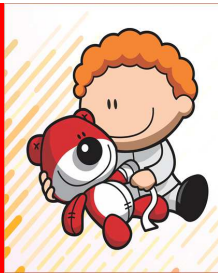


NO RESPONDEDOR



$CNAFO_2$

Unidad Emergencias
Hospital de Pediatría Prof. Dr. Juan P. Garrahan
2017



- ✓N: 58
- ✓Sin comorbilidades: 41 (71%)
- ✓Edad, mediana: 2 meses (1-15 meses)
- ✓No requirieron Ventilación Mecánica = 38 (66 %)
- ✓VNI: 14* IOT/ARM: 6

  *solo VNI
- ✓Complicaciones: 0*

  *2 tuvieron condensación en tubuladura

¡¿Y SI REQUIERE CUIDADOS INTENSIVOS Y LA CAMA NO ESTÁ?!

Ventilación manual: mayor recurso humano, tratamiento subóptimo, complicaciones

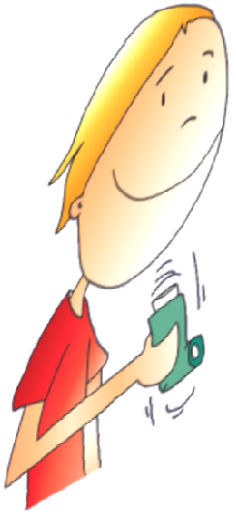
Asistencia Respiratoria Mecánica en una Unidad de Emergencias Pediátricas Nuñez P y col. Unidad Emergencias, Hospital de Pediatría Prof. Dr. Juan P. Garrahan. 8º Congreso Argentino de Emergencias y Cuidados Críticos, SAP; 22º Reunión Anual de la Sociedad Española de Urgencias de Pediatría.

- ✓N: 25
- ✓Edad, mediana: 15 meses (7,5-37,5)
- ✓Período: Septiembre 2014-Noviembre 2016
- ✓Condición crónica: 19 (76%)
- ✓VNI: 4 (16%) IOT/ ARM: 21 (84%)
- ✓Complicaciones: 1 (4%), neumotórax

Otro problema…

EXACERBACIÓN ASMÁTICA

¿QUÉ HACER Y QUÉ NO HACER?



ANTECEDENTES

- Tiempo de comienzo y causa (si se conoce)
- Severidad de los síntomas
- Signosintomatología de anafilaxia
- Factores de riesgo de mortalidad asociada al asma
- Tratamiento actual, cambios, respuesta

EVALUACIONES

- VEF 1. Recomendado. ¿Pero disponible y útil en niños?
- Saturometría de O_2
- Gases en sangre. No de rutina.
  Considerar excitación, fatiga, somnolencia.
- Radiografía de tórax. No de rutina, solo si se sospechan complicaciones u otros diagnósticos (por ej., atelectasia, aspiración de cuerpo extraño)

EXAMEN FÍSICO

- Signos de severidad. Score (FC, FR, tiraje, TA, estado de conciencia, habla, saturometría de O_2)
- Situaciones agravantes (anafilaxia, neumonía, atelectasia, neumotórax, neumomediastino)
- Descartar diagnósticos diferenciales

RECONOCER
Factores que aumentan el riesgo de mortalidad

- Internación con requerimiento de ARM
- Internación o consultas en Emergencias durante el último año
- Uso reciente de corticoides orales (como marcador de evento relevante)
- Falta de uso de corticoides inhalados
- Uso frecuente de agonistas β2
- Trastorno psiquiátrico y/o psicosociales
- Pobre adherencia al tratamiento
- Alergia alimentaria

SOPORTE RESPIRATORIO EN EMERGENCIAS

OXÍGENO

¿Quién se anima a discutir el O_2?

OXÍGENO

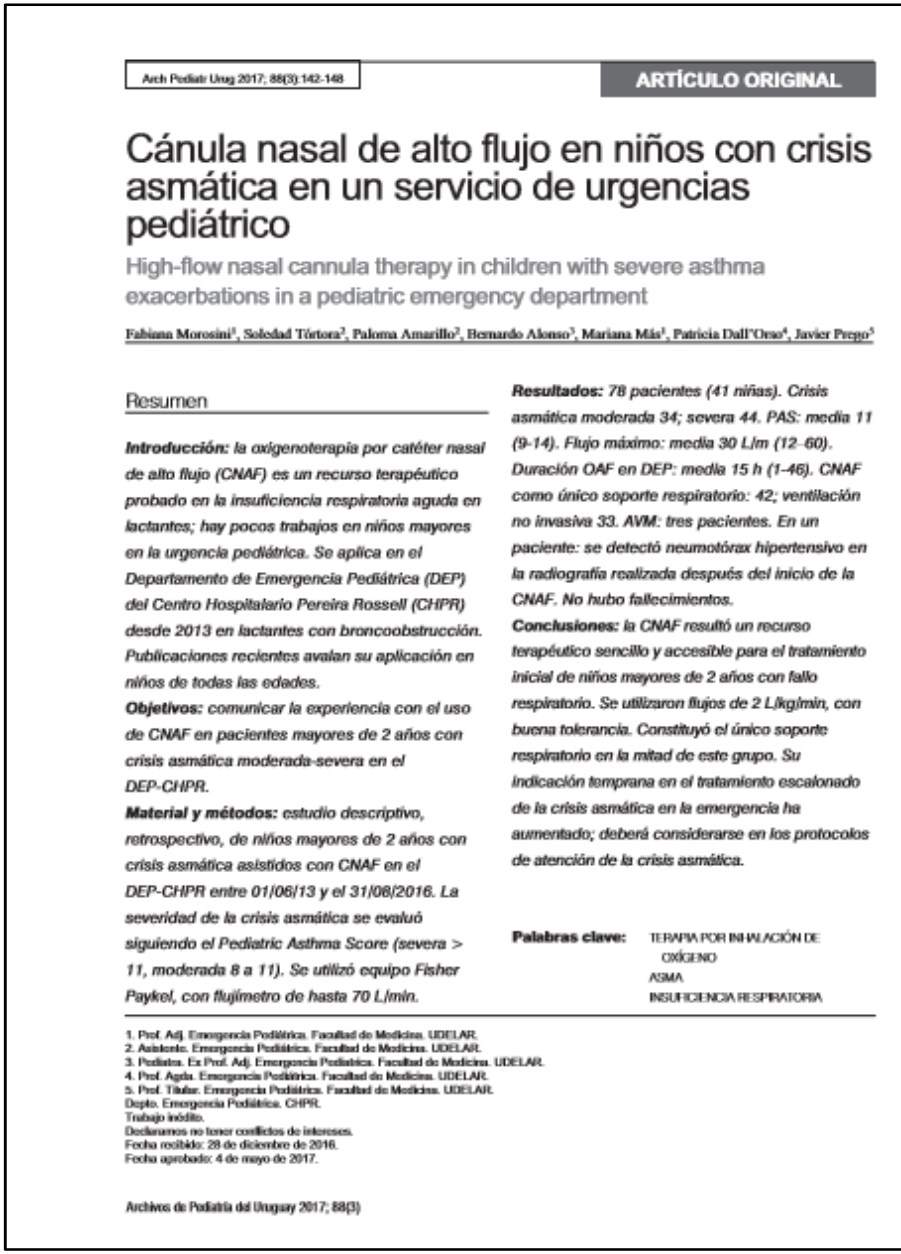
- Cánula nasal o máscara
- Lograda la estabilización, mantener saturometrías de O_2 entre 94 y 98%, controlad con O_2 de bajo flujo.
- O_2 al 100% podría perjudicar la eliminación de CO_2

Chien JW y col. Cleveland, USA. **Uncontrolled oxygen administration and respiratory failure in acute asthma**. *Ches* 2000 Mar;117(3):728-33.

Perrin K y col. Wellington, New Zealand. **Randomised controlled trial of high concentration versus titrated oxygen therapy in se exacerbations of asthma**. *Thorax* 2011 Nov;66(11):937-41.

¿CNAFO$_2$ en exacerbación asmática?

Med Intensiva. 2017 Oct;41(7):418-424.
High-flow nasal cannula therapy versus non-invasive ventilation in children with severe acute asthma exacerbation: An observational cohort study.
Pilar J[1], Modesto I Alapont V[2], Lopez-Fernandez YM[3], Lopez-Macias O[3], Garcia-Urabayen D[3], Amores-Hernandez I[3].
1PICU, Cruces University Hospital, Plaza de Cruces s/n, Barakaldo 48903, Spain. Electronic address: fco.javier.pilarorive@osakidetza.eus.
2PICU, Hospital Universitari i Politècnic La Fe de Valencia, Avinguda de Fernando Abril Martorell, 106, 46026 Valencia, Spain.
3PICU, Cruces University Hospital, Plaza de Cruces s/n, Barakaldo 48903, Spain.
INTRODUCTION: The present study describes our experience with the high-flow humidified nasal cannula (HFNC) versus non-invasive ventilation (NIV) in children with severe acute asthma exacerbation (SA).
METHODS: An observational study of a retrospective cohort of 42 children with SA admitted to a Pediatric Intensive Care Unit (PICU) for non-invasive respiratory support was made. The primary outcome measure was failure of initial respiratory support (need to escalate from HFNC to NIV or from NIV to invasive ventilation). Secondary outcome measures were the duration of respiratory support and PICU length of stay (LOS).
RESULTS: Forty-two children met the inclusion criteria. Twenty (47.6%) received HFNC and 22 (52.3%) NIV as initial respiratory support. There were no treatment failures in the NIV group. However, 8 children (40%) in the HFNC group required escalation to NIV. The PICU LOS was similar in both the NIV and HFNC groups. However, on considering the HFNC failure subgroup, the median length of respiratory support was 3-fold longer (63h) and the PICU LOS was also longer compared with the rest of subjects exhibiting treatment success.
CONCLUSIONS: Despite its obvious limitations, this observational study could suggest that HFNC in some subjects with SA may delay NIV support and potentially cause longer respiratory support, and longer PICU LOS.



Arch Pediatr Urug 2017; 88(3):142-148

ARTÍCULO ORIGINAL

Cánula nasal de alto flujo en niños con crisis asmática en un servicio de urgencias pediátrico

High-flow nasal cannula therapy in children with severe asthma exacerbations in a pediatric emergency department

Fabiana Morosini[1], Soledad Tártora[2], Paloma Amarillo[3], Bernardo Alonso[3], Mariana Más[4], Patricia Dall'Orso[4], Javier Prego[5]

Resumen

Introducción: *la oxigenoterapia por catéter nasal de alto flujo (CNAF) es un recurso terapéutico probado en la insuficiencia respiratoria aguda en lactantes; hay pocos trabajos en niños mayores en la urgencia pediátrica. Se aplica en el Departamento de Emergencia Pediátrica (DEP) del Centro Hospitalario Pereira Rossell (CHPR) desde 2013 en lactantes con broncoobstrucción. Publicaciones recientes avalan su aplicación en niños de todas las edades.*

Objetivos: *comunicar la experiencia con el uso de CNAF en pacientes mayores de 2 años con crisis asmática moderada-severa en el DEP-CHPR.*

Material y métodos: *estudio descriptivo, retrospectivo, de niños mayores de 2 años con crisis asmática asistidos con CNAF en el DEP-CHPR entre 01/06/13 y el 31/08/2016. La severidad de la crisis asmática se evaluó siguiendo el Pediatric Asthma Score (severa > 11, moderada 8 a 11). Se utilizó equipo Fisher Paykel, con flujímetro de hasta 70 L/min.*

Resultados: *78 pacientes (41 niñas). Crisis asmática moderada 34; severa 44. PAS: media 11 (9-14). Flujo máximo: media 30 L/m (12-60). Duración OAF en DEP: media 15 h (1-46). CNAF como único soporte respiratorio: 42; ventilación no invasiva 33. AVM: tres pacientes. En un paciente: se detectó neumotórax hipertensivo en la radiografía realizada después del inicio de la CNAF. No hubo fallecimientos.*

Conclusiones: *la CNAF resultó un recurso terapéutico sencillo y accesible para el tratamiento inicial de niños mayores de 2 años con fallo respiratorio. Se utilizaron flujos de 2 L/kg/min, con buena tolerancia. Constituyó el único soporte respiratorio en la mitad de este grupo. Su indicación temprana en el tratamiento escalonado de la crisis asmática en la emergencia ha aumentado; deberá considerarse en los protocolos de atención de la crisis asmática.*

Palabras clave: TERAPIA POR INHALACIÓN DE OXÍGENO
ASMA
INSUFICIENCIA RESPIRATORIA

1. Prof. Adj. Emergencia Pediátrica. Facultad de Medicina. UDELAR.
2. Asistente. Emergencia Pediátrica. Facultad de Medicina. UDELAR.
3. Pediatra. Ex Prof. Adj. Emergencia Pediátrica. Facultad de Medicina. UDELAR.
4. Prof. Agda. Emergencia Pediátrica. Facultad de Medicina. UDELAR.
5. Prof. Titular. Emergencia Pediátrica. Facultad de Medicina. UDELAR.
Depto. Emergencia Pediátrica. CHPR.
Trabajo inédito.
Declaramos no tener conflictos de intereses.
Fecha recibido: 28 de diciembre de 2016.
Fecha aprobado: 4 de mayo de 2017.

Archivos de Pediatría del Uruguay 2017; 88(3)

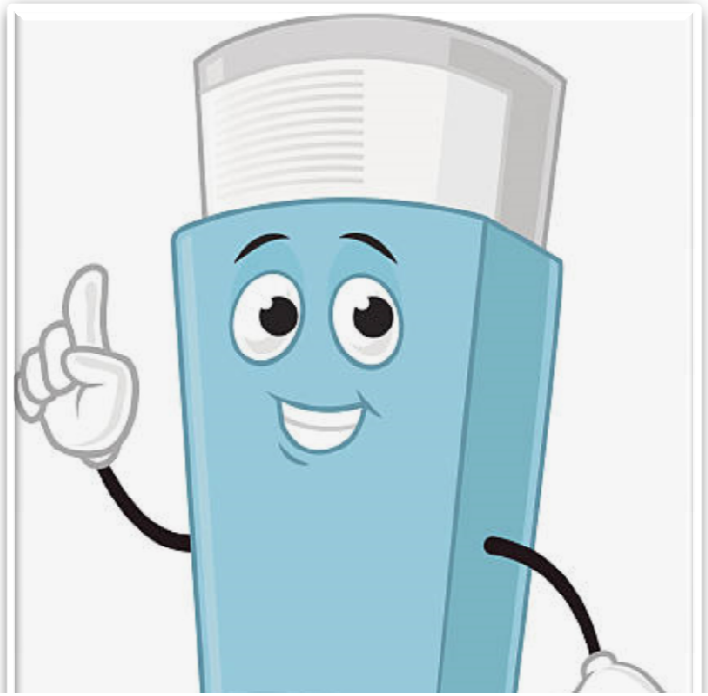
¿Y LOS AGONISTAS β2?

¿Son indiscutibles?

Agonistas β2 de corta duración inhalados

lock M, Sinha IP y col.
aled short-acting bronchodilators for naging emergency childhood asthma: an erview of reviews.
ergy 2017 Feb;72(2):183-200.

os resultados demuestran la eficacia el agonista β2 de corta acción dministrado por cámara inhaladora omo terapia de primera línea para iños con asma.



NEBULIZACIÓN VS. CÁMARA INHALADORA

ARTICLE

Metered-Dose Inhalers With Spacers vs Nebulizers for Pediatric Asthma

Katherine J. Chou, MD; Sandra J. Cunningham, MD; Ellen F. Crain, MD, PhD

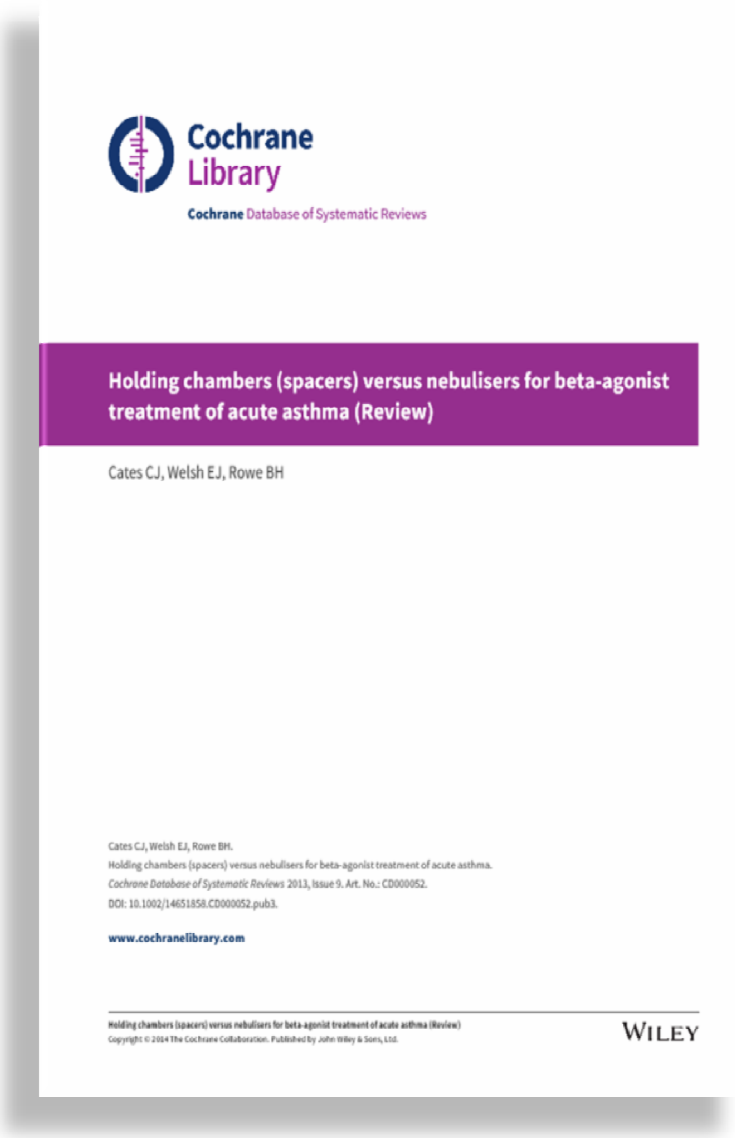
Conclusions: These data suggest that MDIs with spacers may be an effective alternative to nebulizers for the treatment of children with acute asthma exacerbations in the ED.

(Arch Pediatr Adolesc Med. 1995;149:201-205)

Agonistas β2 : Nebulización vs. Cámara inhaladora

os aerosoles con un espaciador pueden ser tan buenos
omo el nebulizador pero finalmente puede terminar
endo mas práctico (mejor costo/efectividad-eficiencia)

5 años: por cámara espaciadora o nebulizado.
ás eficiente y aceptada la cámara espaciadora.



tselou N y col. Suecia. J *Asthma* 2016 Dec;53(10):1059-62. Spacers versus nebulizers in
atment of acute asthma - a prospective randomized study in preschool children.

**tes CJ y col. Holding chambers (spacers) versus nebulisers for beta-agonist treatment
acute asthma. *Cochrane Database Syst Rev* 2013 Sep 13;(9)**

erojanawong J y col. Tailandia. Randomized controlled trial of salbutamol aerosol
erapy via metered dose inhaler-spacer vs. jet nebulizer in young children with
eezing. *Pediatr Pulmonol* 2005 May;39(5):466-72.

stro Rodríguez JA y col. Chile. beta-agonists through metered-dose inhaler with valved
ding chamber versus nebulizer for acute exacerbation of wheezing or asthma in
ldren under 5 years of age: a systematic review with meta-analysis. *J Pediatr* 2004
g;145(2):172-7.

ou KJ y col. NY, USA. Metered-dose inhalers with spacers vs nebulizers for pediatric
hma. *Arch Pediatr Adolesc Med* 1995 Feb;149(2):201-5.

Agonistas β2 nebulizados… ¿continuo o intermitente?

CONTROVERSIAS

Agonistas β2 nebulizados… ¿continuo o intermitente?

Rodrigo GJ, Rodrigo C.
Montevideo, Uruguay.
Continuous vs intermittent beta-agonists in the treatment of acute adult asthma: a systematic review with meta-analysis. *Chest* 2002 Jul;122(1):160-5.

- Esta revisión apoya la **equivalencia** de nebulización **continua e intermitente** de albuterol en el tratamiento del asma agudo en adultos

Camargo CA y col.
Boston, USA.
Continuous versus intermittent beta-agonists in the treatment of acute asthma. *Cochrane Database Syst Rev.* 2003;(4)

- Apoya el uso de **β_2 agonistas continuos** en pacientes con asma aguda severa para aumentar su función pulmonar y reducir la hospitalización. Además parece ser seguro y bien tolerado.

NO CONCLUYENTE

Systematic Review Snapshot

TAKE-HOME MESSAGE

ontinuous nebulized β-agonist therapy reduces hospital admissions compared with intermittent β-agonist treatments in moderate to severe asthma exacerbations.

ETHODS

TA SOURCES

investigators searched the hrane Airways Group Special- Register of Trials. Authors, sonal contacts, and advisors to rmaceutical companies were tacted, and reference lists of lies used were reviewed to tify any further studies.

UDY SELECTION

y randomized clinical trials paring continuous versus in- nittent inhaled β-agonists in ents presenting to an emer- cy department (ED) or its ivalent were considered for usion.

TA EXTRACTION AND NTHESIS

dy quality was measured by 2 pendent reviewers using the

Is Continuous Nebulized β-Agonist Therapy More Effective Than Intermittent β-Agonist Therapy at Reducing Hospital Admissions in Acute Asthma?

EBEM Commentators
Angela K. Gregory, MD
Christian H. Jacobus, MD
Synergy Medical Education Alliance
Central Michigan University College of Human Medicine
Saginaw, MI

Results

Summary of hospital admissions according to severity.

Asthma Severity	Continuous (n/N)	Intermittent (n/N)	RR (95% CI)	Approximate NNT
Moderate to severe	44/169	68/172	0.64 (0.47–0.87)	7
Less severe	7/60	7/60	1.12 (0.44–2.85)	—
Total	41/229	75/232	0.68 (0.51–0.92)	8

n, Number of admissions; *N*, total number of subjects; *RR*, relative risk; *CI*, confidence interval; *NNT*, number needed to treat.

Twenty studies were ultimately identified for potential inclusion. Four studies were excluded because they were not randomized controlled trials, another 6 were excluded because they did not compare continuous differences in peak flow tests. For the subset of patients with severe asthma, there was a significant reduction in pulmonary function tests and hospital admissions with the use of continuous β-agonist therapy. There was no significant

whether there is a benefit compared with intermittent nebulized β-agonist administration for adult patients. Only 2 studies included children, and though these conclusions could apply to children, this systematic review could not reach that conclusion.

Continuous β-agonist treatments resulted in significantly improved peak flow rates, and changes in peak flow have been found to be a significant contributing factor in hospital admissions.[3] Therefore, hospitalization rates were also decreased in severe asthma exacerbations. Mild to moderate exacerbations showed no noticeable change in admission rates. However, it was difficult to separate these data into categories of disease severity because not all studies categorized severity similarly.

Despite continuous nebulization's being found safe overall, there has been concern that it increases the incidence of hypokalemia.[4] Potassium concentrations were reported in only 3 trials, but no significant difference was observed between treatment groups. There was also no significant increase in tachycardia or tremors in the continuous β-agonist groups. It is still important to consider possible adverse effects, as well as slightly increased cost, when considering continuous nebulization. As always, clinical judgment is necessary, but in severe exacerbations, continuous nebulization appears to be more beneficial.

Editor's Note: This is a clinical synopsis, a regular feature of the *Annals'* Systematic Review Snapshot (SRS) series. The source for this systematic review snapshot is: Camargo CA Jr, Spooner C,

Rowe BH. Continuous versus i
tent beta-agonists for acute asth
chrane Database Syst Rev. 2
CD001115. doi:10.1002/14651858. CI

Schappert SM, Rechtsteiner
estimates for 2007. National Cen
Health Statistics. *Vital Health Sta*
(169):1-38.
2. Olshaker J, Jerrard D, Barish RA,
The efficacy and safety of a conti
albuterol protocol for the treatme
acute adult asthma attacks. *Am*
Med. 1993;11:131-133.
3. Tsai CL, Clark S, Camargo CA Jr.
stratification for hospitalization in
asthma: the CHOP classification t
Am J Emerg Med. 2010;28:803-8
4. Portnoy J, Nadel G, Amado M, et
Continuous nebulization for status
asthmaticus. *Ann Allergy.* 1992;6

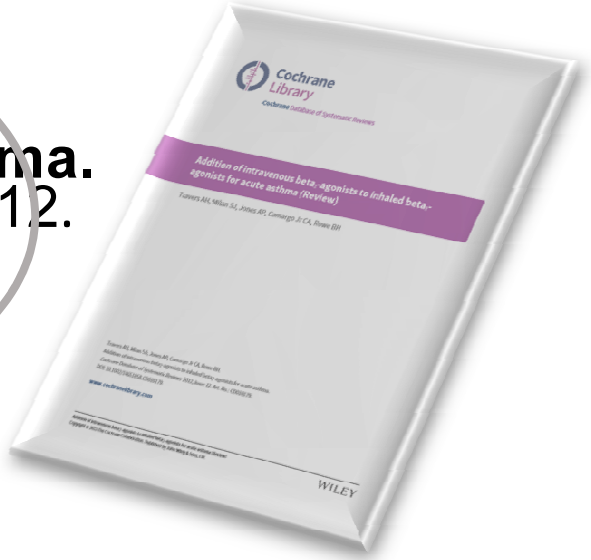
Michael Brown, MD, MSc, Ala
MD, and David Newman, MD,
editors of the SRS series.

CHEEE…¿Y los agonistas β2 por VÍA INTRAVENOSA?

¿Y los agonistas β2 por VIA INTRAVENOSA?

Travers AH y col.
Addition of intravenous beta(2)-agonists to inhaled beta(2)-agonists for acute asthma.
Cochrane Database Syst Rev. 2012 Dec 12;12.

- **Evidencia muy limitada**, cuidadosamente por **efectos secundarios incrementados**
  No se encontró evidencia en adultos.



consi

Doymaz S y col. NY, USA. **Early administration of terbutaline in severe pediatric asthma may reduce incidence of acute respiratory failure.** *Ann Allergy Asthma Immunol* 2014 Mar;112(3):207-10.

- La administración temprana de terbutalina continua puede disminuir la insuficiencia respiratoria aguda y la necesidad de apoyo respiratorio mecánico.

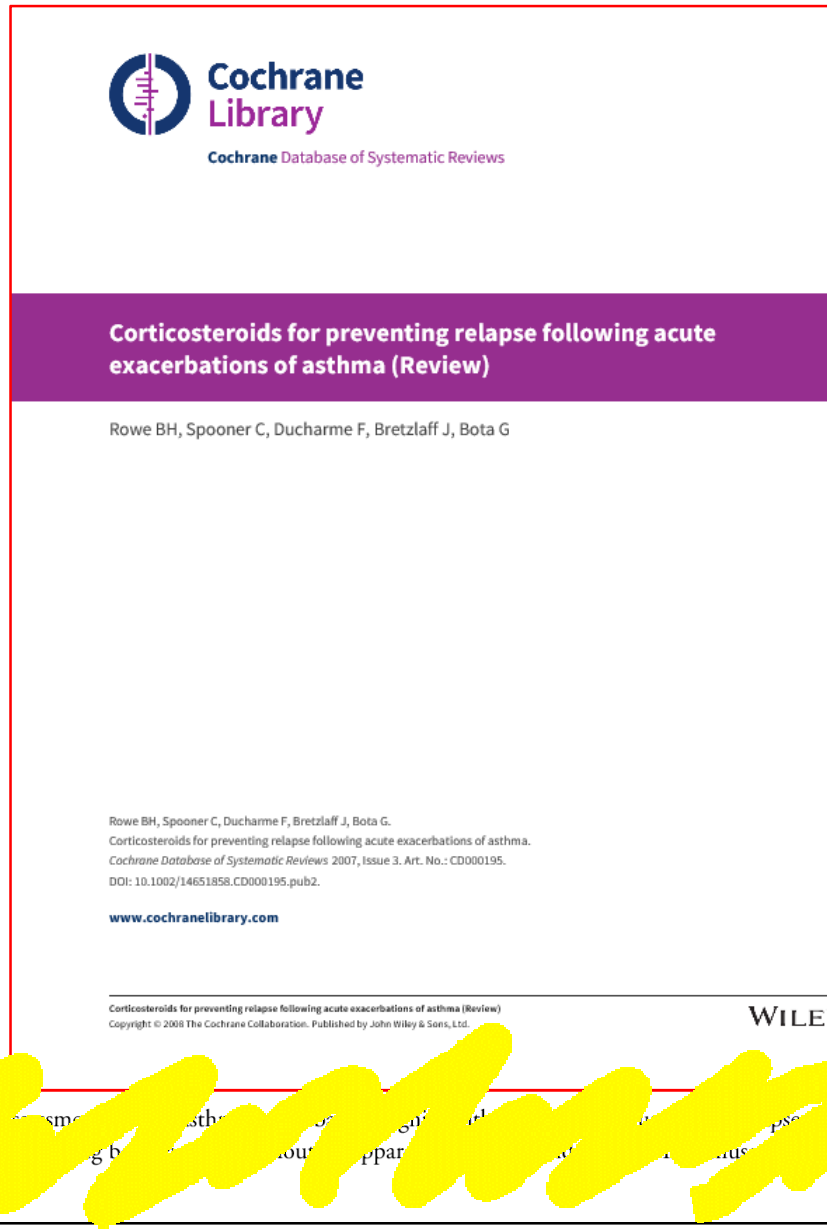
Doymaz S y col. NY, USA. **Safety of Terbutaline for Treatment of Acute Severe Pediatric Asthma.** *Pediatr Emerg Care* 2016 Mar 8.

- Infusión bien tolerada, sin efectos adversos irreversibles. Alteraciones hemodinámicas y metabólicas que representaron poco riesgo.

rticoesteroide
sistémicos

sistémicos ¿orales o

- **La vía oral es tan efectiva como la vía parenteral**
- **Vía oral** es más rápida, menos invasiva y más económica
- Observar franca mejoría clínica a las 4 horas
- **Vía parenteral** cuando no tolera la vía oral, alteración de la conciencia, VNI o IOT/ARM


Cochrane Library

Cochrane Database of Systematic Reviews

Corticosteroids for preventing relapse following acute exacerbations of asthma (Review)

Rowe BH, Spooner C, Ducharme F, Bretzlaff J, Bota G

Rowe BH, Spooner C, Ducharme F, Bretzlaff J, Bota G.
Corticosteroids for preventing relapse following acute exacerbations of asthma.
Cochrane Database of Systematic Reviews 2007, Issue 3. Art. No.: CD000195.
DOI: 10.1002/14651858.CD000195.pub2.

www.cochranelibrary.com

Corticosteroids for preventing relapse following acute exacerbations of asthma (Review)

WILE

ertensive subjects might be related to a tendency sodium excretion by the kidney, either as a result ed renal abnormality or as a consequence of the pressure. This could cause sodium retention and creased compensatory mechanisms to excrete the m. Most patients with essential hypertension, ther have normal or low blood volume.[12,13] s, several studies have shown a rise in central sure in hypertensives compared with normoten- oreover, London and colleagues[14] have shown ary wedge pressure is raised in hypertensive that the increased pressure is not due to an cardiac pump function, but most probably rease in compliance of the venous system with a d towards the central region. This is likely to lease of ANP, especially since in animal increases in intra-atrial pressure are associated increases in ANP release.[15] Additionally, water xperiments in man[16] show a similar shift of blood with a rise in atrial pressure and an associated rculating levels of ANP.[17] ional significance of increased ANP levels in pertension remains to be determined. It is t ANP could modify vascular reactivity in and play a role in determining sodium balance; so explain the well-recognised exaggerated en in patients with essential hypertension.

s supported by the National Kidney Research Foundation. a Wellcome Trust senior lecturer.

ce should be addressed to G. A. S., Blood Pressure Unit, Medicine, Charing Cross and Westminster Medical School, F.

REFERENCES

A. Sodium is more important than calcium in essential hypertension.

NEED FOR INTRAVENOUS HYDROCORTISONE IN ADDITION TO ORAL PREDNISOLONE IN PATIENTS ADMITTED TO HOSPITAL WITH SEVERE ASTHMA WITHOUT VENTILATORY FAILURE

B. D. W. HARRISON
G. J. HART†
N. J. ALI
T. C. STOKES*
D. A. VAUGHAN
A. A. ROBINSON

Department of Respiratory Medicine, West Norwich Hospital, Norwich, Norfolk

Summary 52 severely ill asthmatic patients requiring acute admission to hospital entered a double-blind placebo-controlled trial to determine whether intravenous hydrocortisone given in addition to high-dose oral prednisolone and standard bronchodilator therapy accelerated recovery. Patients who had been given parenteral steroids before admission, by comparison with those who had not received such treatment, had been deteriorating for a shorter period before admission, had received more injected or nebulised bronchodilator therapy, and had higher admission peak flows. As judged by peak flow measurements 24 h after admission, parenteral steroids had no effect on the outcome, irrespective of whether they were given before or after (ie, intravenous hydrocortisone) admission. There is no evidence for the continued use of intravenous hydrocortisone in addition to oral prednisolone and bronchodilator therapy in patients admitted to hospital with severe asthma without ventilatory failure.

Introduction

IN a double-blind placebo-controlled trial in 1956, the Medical Research Council established that oral cortisone

J... Jul. 22-29;260(4):527-9.

Are intravenous corticosteroids required in status asthmaticus?

Ratto D[1], Alfaro C, Sipsey J, Glovsky MM, Sharma OP.

1Department of Pulmonary Medicine, Los Angeles County, University of Southern Ca Medical Center 90033.

Seventy-seven patients with status asthmaticus were prospectively studied to compa intravenous methylprednisolone. Patients were given methylprednisolone, either 160 orally or 500 or 1000 mg intravenously, daily in equally divided doses. They were ran assigned to either group on a daily sequential basis. Spirometry was performed withi of the initial dose of steroids. The mean presenting forced expiratory volume in 1 s wa the predicted value. Spirometry was then repeated every six hours for the first 24 hou then every eight to 12 hours until discharge or 72 hours, whichever occurred first. The no significant differences in the incidence of respiratory failure, forced expiratory volu days of hospitalization, rate of improvement in pulmonary function, or side effects. No who went into respiratory failure did so more than three hours after receiving the initia steroids. We conclude tha oral methylprednisolone is safe and effective in the treatm status asthmaticus.

DOSIS de corticoesteroides

- Meprednisona 1 mg/kg/día, máximo 40 mg/día
- Hidrocortisona 3-5 mg/kg (máximo 200 mg)

2002 Aug;122(2):624-8.
se behavioral effects of treatment for acute exacerbation of asthma dren: a comparison of two doses of oral steroids.
S[1], Shannon DC.
ment of Pediatrics, Bridgeport Hospital, Bridgeport, CT, USA.
TIVE: To determine the relative adverse symptomatic effects and benefits of therapy with ticosteroids at doses of 2 mg/kg vs 1 mg/kg daily in children with acute exacerbations of

Because the [redacted], we recommend using an oral corticosteroid dose of 1 mg/kg daily for children with mild persistent asthma who present with an acute exacerbation of asthma.

DURACIÓN de tratamiento con corticoesteroides orales

➢3-5 días

- Hasewaga T y col. Kobe, Japón. **Duration of systemic corticosteroids in the treatment of asthma exacerbation; a randomized study.** *Intern Med* 2000 Oct;39(10):794-7.

- Jones AM y col. Salford, Reino Unido. **Prospective, placebo-controlled trial of 5 vs 10 days of oral prednisolone in acute adult asthma.** *Respir Med* 2002 Nov;96(11):950-4.

¿Y si usamos los CORTICOESTEROIDES INHALADOS?

CORTICOESTEROIDES INHALADOS

- Altas dosis de corticoides inhalados **en aquellos pacientes que no se encuentran recibiendo corticoides sistémicos puede reducir la internación.**
- **En los que se encuentran recibiendo corticoesteroides sistémicos no es tan claro.**
- Más allá de este nivel de evidencia,

  NO ESTÁ TAN CLARO el rol del corticoesteroide inhalado en la exacerbación asmática (cuál, cuánto)
- No es necesario disminuir la dosis de corticoesteroides orales en pacientes que reciben corticoesteroides inhalados

Edmonds ML, Milan SJ y col**. Early use of inhaled corticosteroids in the emergency department treatment of acute asthma.** *Cochrane Data System Rev.* 2012 Dec 12;12:CD002742.

Reduce la admisión hospitalaria en pacientes con asma aguda que no son tratados con corticoides orales o intravenosos. También pueden reducir las admisiones cuando se usan además de corticosteroides sistémicos; sin embargo, la evidencia más reciente es contradictoria. No hay pruebas suficientes que de lugar a cambios clínicamente importantes en la función pulmonar o puntuaciones clínicas cuando se usa en asma aguda además de corticosteroides sistémicos. Además, no hay pruebas suficientes de que el tratamiento se puede usar en lugar de la terapia sistémica con corticosteroides cuando se trata el asma aguda.

¿Anticolinérgicos (Bromuro de Ipratropio)?

- En crisis moderadas-severas, y en adición a los β2 agonistas de corta acción, pueden mejorar la función pulmonar y disminuir las internaciones.
- No está demostrado que la continuación de su uso cuando durante la internación tenga beneficio, no acorta la estancia hospitalaria.

Rodrigo GJ y col. THORAX 2005

✓ REDUCCIÓN DE INTERNACIONES

interval) in forced expiratory volume in the first second (change in percentage
lition of anticholinergic agents to β_2 agonists (treatment) with β_2 agonists alone
eatment (one or two doses *v* more than two doses).

ASTHMA

Anticholinergics in the treatment of children and adults with acute asthma: a systematic review with meta-analysis

G J Rodrigo, J A Castro-Rodriguez

Thorax 2005;**60**:740–746. doi: 10.1136/thx.2005.040444

See end of article for authors' affiliations

Correspondence to: Dr G J Rodrigo, Departamento de Emergencia, Hospital

Background: Current guidelines recommend the use of a combination of inhaled β_2 agonists and anticholinergics, particularly for patients with acute severe or life threatening asthma in the emergency setting. However, this statement is based on a relatively small number of randomised controlled trials and related systematic reviews. A review was undertaken to incorporate the more recent evidence available about the effectiveness of treatment with a combination of β_2 agonists and anticholinergics compared with β_2 agonists alone in the treatment of acute asthma.

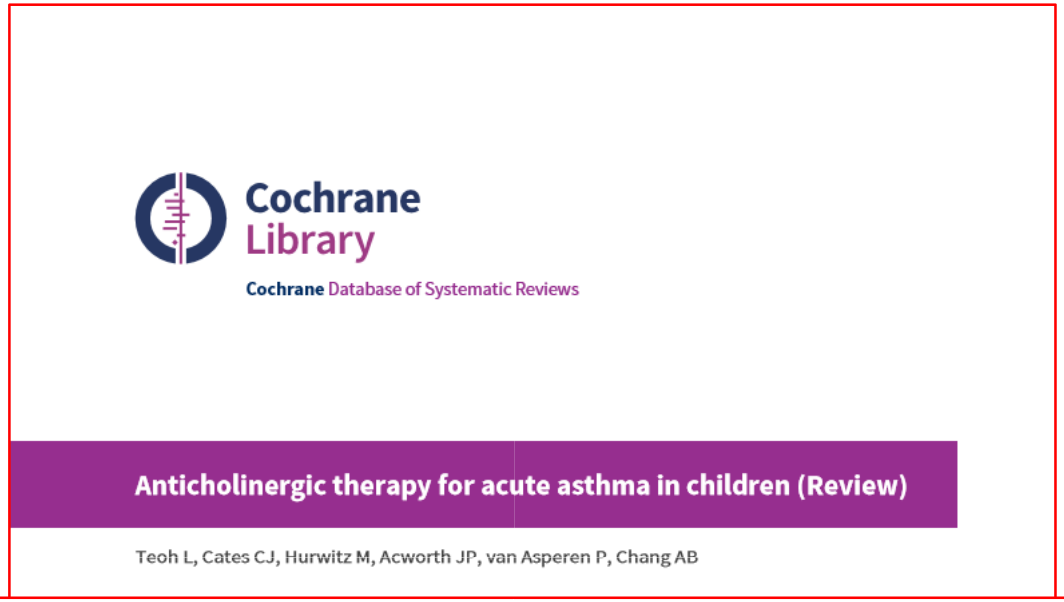
Methods: A search was conducted of all randomised controlled trials published before April 2005.

ipratropium and those treated with salbutamol alone.[20]

adolescents, and adults with acute asthma in the ED setting. New data were found which we added to previous review.[3 5] Thus, 10 new randomised trials (four in children[24–27] and six in adults[33 34 39 41–43]) with a total of 809 patients have been added, representing an increase of 22% on the previous sample. Unlike the previous reviews, this study has enabled analysis of the effect of cumulative doses, particularly in adult studies. Several important conclusions can be made. Overall, our analysis confirmed that early administration of inhaled anticholinergic agents with β_2 agonists lead to a reduction in admission rates of both children and adults of 30%. Baseline severity and the intensity of the anticholinergic protocol clearly influenced the magnitude of the benefit. Thus, anticholinergic agents are particularly beneficial in patients with moderate to severe obstruction (FEV_1 <70% of predicted) treated with multiple dose fixed protocols consisting of three or more doses of an anticholinergic. These patients had a reduction in the hospital admission rate of 30–45% and only 6–14 subjects need to be treated to prevent one hospital admission. This is a very relevant finding since hospital admissions count for the largest part of direct health

COCHRANE 2012

✓ **NO**
BROMURO DE
PRATROPIO
SOLO



Cochrane Library

Cochrane Database of Systematic Reviews

Anticholinergic therapy for acute asthma in children (Review)

Teoh L, Cates CJ, Hurwitz M, Acworth JP, van Asperen P, Chang AB

In children over the age of two years with acute asthma exacerbations, inhaled anticholinergics as single agent bronchodilators were
efficacious than beta$_2$-agonists. Inhaled anticholinergics were also less efficacious than inhaled anticholinergics combined with be
agonists. [redacted] for use as a single agent in children with acute asthma exacerbatio

Teoh L, Cates CJ, Hurwitz M, Acworth JP, van Asperen P, Chang AB.
Anticholinergic therapy for acute asthma in children.
Cochrane Database of Systematic Reviews 2012, Issue 4. Art. No.: CD003797.
DOI: 10.1002/14651858.CD003797.pub2.

www.cochranelibrary.com

COCHRANE 2013

Cochrane Library

Cochrane Database of Systematic Reviews

Combined inhaled anticholinergics and short-acting beta$_2$-agonists for initial treatment of acute asthma in children (Review)

Griffiths B, Ducharme FM

Children with an asthma exacerbation experience a l[redacted] to hospital if they are treated v[redacted] inhaled [redacted] versus SABA alone. They also experience [redacted] of nausea and trem[redacted]. Within this group, the findings suggested, but did not prove, the possibility of an effect modification, where intensity of anticholinergic treatment and asthma severity, could be associated with greater benefit.

Further research is required to identify the characteristics of children that may benefit from anticholinergic use (e.g. age and asthma severity including mild exacerbation and impending respiratory failure) and the treatment modalities (dose, intensity, and duration) associated with most benefit from anticholinergic use better.

Cochrane Database of Systematic Reviews 2013, Issue 8. Art. No.: CD000060.
DOI: 10.1002/14651858.CD000060.pub2.

www.cochranelibrary.com

✓ **SI**

BROMURO DE IPATROPIO COMBINADO CON SALBUTAM

COCHRANE 2014

Cochrane Library

Cochrane Database of Systematic Reviews

Inhaled anticholinergics and short-acting beta$_2$-agonists versus short-acting beta2-agonists alone for children with acute asthma in hospital (Review)

Vézina K, Chauhan BF, Ducharme FM

In children hospitalised for an acute asthma exacerbation, [redacted] No adverse health effects were reported, yet the small number of trials combined with inadequate reporting prevent firm reassurance regarding the safety of anticholinergics. In the absence of trials conducted in ICUs, no conclusion can be drawn regarding children with impending respiratory failure. These findings support current national and international recommendations indicating that healthcare practitioners should refrain from using anticholinergics in children hospitalised for acute asthma.

Vézina K, Chauhan BF, Ducharme FM.
Inhaled anticholinergics and short-acting beta$_2$-agonists versus short-acting beta2-agonists alone for children with acute asthma in hospital.
Cochrane Database of Systematic Reviews 2014, Issue 7. Art. No.: CD010283.
DOI: 10.1002/14651858.CD010283.pub2.

www.cochranelibrary.com

NO HAY EVIDENCIA PARA PROLONGAR SU USO DURANTE LA INTERNACIÓN

…¿QUÉ HAY CON LA AMINOFILINA?

AMINOFILINA

- ✓Pobre eficacia
- ✓Perfil de seguridad, estrecho margen
- ✓Potenciales eventos adversos graves

- Travers AH y col**. Intravenous beta(2)-agonists versus intravenous aminophylline for acute asthma.** *Cochrane Database Syst Rev* 2012 Dec 12;12:CD010256.

  Sin evidencia consistente

- Nair P y col. **Addition of intravenous aminophylline to inhaled beta(2)-agonists in adults with acute asthma.** *Cochrane Database Syst Rev* 2012 Dec 12;12:CD002742.

  No genera broncodilatación adicional significativa o reducción de internación. 20 % tienen vómitos, 15% palpitaciones y arritmias

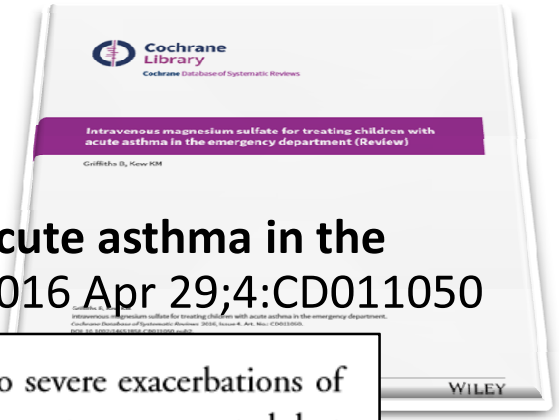
AMINOFILINA IV
Unidad Cuidados Intensivos Polivalentes
Hospital de Pediatría Prof. Dr. Juan P. Garrahan.

- ✓Período: Octubre 2014- Agosto 2016
- ✓Internaciones: 38
- ✓Pacientes: 36 (19 varones)
- ✓Edad, mediana: 5 años
- ✓Aminofilina IV: 6 (16%)
- ✓AVM en pacientes que recibieron aminofilina IV: 6 (100%)

¿ACÁ SI VA EL SULFATO DE MAGNESIO?

Sulfato de magnesio IV

- Ante la falta de respuesta esperada a los agonistas β2 inhalados, anticolinérgicos inhalados y corticoides sistémicos
- Después de 1 hora de iniciado el tratamiento (¡ojo!, considerar cuando inició tratamiento de manera adecuada, y observar evolución a lo largo de los 60´)
- Puede reducir la tasa de internación
- Podría ser usado en ≥ 2 años



Griffiths B y col. **Intravenous magnesium sulfate for treating children with acute asthma in the emergency department.**Griffiths B[1], Kew KM *Cochrane Database Syst Rev.* 2016 Apr 29;4:CD011050

> IV $MgSO_4$ n[redacted] the need for hospital admission in children presenting to the ED with moderate to severe exacerbations of asthma, but the [redacted]is extremely [redacted]by the number and size of studies. Few side effects of the treatment were reported, but the data were extremely limited.

- ✓ **DISMINUYE LA NECESIDAD DE AVM**
- ✓ **REDUCE LA ESTANCIA**

Arch Argent Pediatr 2012;110(4):291-297

Eficacia del sulfato de magnesio como tratamiento inicial del asma aguda grave pediátrica. Estudio aleatorizado y controlado

Effectiveness of magnesium sulfate as initial treatment of acute severe asthma in children. A randomized, controlled trial

Dr. Silvio Torres[a], Dr. Nicolás Sticco[a], Dr. Juan José Bosch[a], Dr. Tomás Iolster[a], Dr. Alejandro Siaba[a], Dr. Manuel Rocca Rivarola[a] y Dr. Eduardo Schnitzler[a]

Departamento Materno infantil. Hospital Universitario Austral. Pilar, Buenos Aires.

TABLA 4. *Análisis univariado*

	Grupo tratamiento n= 76	Grupo control n= 67	p
[redacted]	[redacted]	[redacted]	0,001
Estadía en AVM (días) α	3 (1-6)	5 (2-12)	0,087
[redacted] α	[redacted] (3-12)	[redacted] (14-29)	0,046
Estadía en UCIP (días) α	2 (1-4)	10 (6-18)	0,0376

α: mediana, intervalo intercuartilo.

TABLA 5. *Análisis de regresión logística sobre la mejoría clínica objetivada en la variable determinada "entrada a AVM"*

Variables regresoras	OR (IC 95%)	p
Tratamiento con sulfato de magnesio	0,680, (0,238-0,836)	0,0147
Antecedentes familiares de asma	1,239, (0,565-3,4103)	(NS)
Tratamiento previo ambulatorio con β2 inhalados y corticoides inhalados	1,3669, (0,821-5,168)	(NS)
Edad ≤ 60 meses (5 años)	2,639, (1,205-4,108)	0,041

AVM: Asistencia ventilatoria mecánica.

Sulfato de magnesio nebulizado

- No está tan claro
- Posible mejora

- Powell C y col. **Inhaled magnesium sulfate in the treatment of acute asthma.** *Cochrane Database Syst Rev.* 2012 Dec 12;12:CD003898.

> There is currently [redacted] that inhaled $MgSO_4$ can be used as a substitute for inhaled β_2-agonists. When used in addition to inhaled β_2-agonists (with or without inhaled ipratropium), there is currently no overall clear evidence of improved pulmonary function or reduced hospital admissions. However, individual study results from t[redacted] in those with severe asthma exacerbations (FEV1 less than 50% predicted). Heterogeneity among trials included in this review precludes a more definitive conclusion. Further studies should focus on inhaled $MgSO_4$ in addition to the current guideline treatment for acute asthma (inhaled β_2 -agonist and ipratropium bromide). As the evidence suggests that the most effective role of nebulised $MgSO_4$ may be in those with severe acute features and this is where future research should be focused. A set of core outcomes needs to be agreed upon both in adult and paediatric studies to allow improved study comparison in future.

Vamos terminando, ¿QUÉ MÁS?

Helio-O_2

- No está indicado habitualmente
  dentro del tratamiento escalonado de rutina.
- Algunos sugieren su uso
  ante falta de respuesta.
  Considerar disponibilidad, técnica y costos

COMBINACION DE AGONISTAS β2 DE ACCIÓN PROLONGADA + CORTICOIDES INHALADOS

- No está claro.
  - Balanag VM y col. **Efficacy and safety of budesonide/formoterol compared with salbutamol in the treatment of acute asthma.**Balanag VM[1], Yunus F, Yang PC, Jorup C.*Pulm Pharmacol Ther* 2006;19(2):139-47.

Plantea similar eficacia y seguridad a altas dosis de B2 de corta acción en aquellos que recibieron corticoides orales

ANTAGONISTA DE RECEPTORES DE LEUCOTRIENOS

- Oral e IV.

En adición al tratamiento estándar.
Evidencia limitada. Podría mejorar

- Watts k y col. **Leukotriene receptor antagonists in addition to usual care for acute asthma in adults and children.** Cochrane Database Syst Rev. 2012 May 16;(5):CD006100.

Antibióticos

Antihistamínicos

Sedación

Ey…¿No se
olvidan de la
ketamina?

Systematic Review Snapshot

TAKE-HOME MESSAGE

Limited data from a single randomized controlled trial do not support the routine use of ketamine for children with acute asthma exacerbations that are unresponsive to initial aerosolized β_2-agonist or steroids.

METHODS

DATA SOURCES

The authors identified trials from the Cochrane Airways Group Specialized Register of trials. This collection includes the following databases: Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, CINAHL, The Allied and Complementary Medicine Database and PsycINFO. All databases were searched without language restrictions from their inception to July 2012. ClinicalTrials.gov was queried for ongoing clinical trial data. Respiratory journals and meeting abstracts (including those of the Society for Academic Emergency Medicine and the Canadian Association of Emergency Physicians) were hand searched. The authors also searched reference lists of primary studies and contacted study authors, experts in the field, and manufacturers.

STUDY SELECTION

Only randomized controlled trials of children (up to aged 18 years) presenting with an acute asthma exacerbation not responding to standard therapy with aerosolized β_2-agonists with or without an anticholinergic agent after 1 hour and oral or intravenous corticosteroids were included. The

Is Ketamine Effective for the Management of Acute Asthma Exacerbations in Children?

EBEM Commentators
Randolph P. Maddox, MD
Rawle A. Seupaul, MD
Department of Emergency Medicine
University of Arkansas for Medical Sciences
Little Rock, AR

Results

Estimated benefit of ketamine compared to placebo for children with acute asthma exacerbation that fail standard therapy based on a single trial (N=68).

Time	Pulmonary Index Score (Mean Difference)	95% Confidence Interval
2 h	0.40	(−0.4 to 1.3)

The search identified 5 potential studies; only 1 trial[2] met inclusion criteria so a meta-analysis could not be performed. This trial was appropriately powered to detect a difference in asthma severity by using the pulmonary index score; the pulmonary index is a composite score based on physical findings in children with asthma, ranging from 0 to 15 points (scores ≤7 are considered mild exacerbations, whereas scores ≥14 are considered severe).[3] Children who failed standard therapy (N=68) were randomized to receive either placebo or 0.2 mg/kg of ketamine as an intravenous bolus, followed by a continuous infusion at 0.5 mg/kg per hour. None of the patients required mechanical ventilation and there were no significant adverse effects in either group.

Commentary

Asthma is the most common chronic disease of childhood, affecting millions of children in the United States, and is a major cause of morbidity and mortality. Children with severe acute asthma exacerbations have the potential to deteriorate into respiratory failure. In the most severe cases, standard aggressive treatment may fail [illegible] 5-mg/kg bolus followed by a 2- to 5-mg/kg per hour infusion).[7] Although ketamine would seem to offer a physiologically plausible advantage, more high-quality randomized data are required to determine its efficacy in avoiding intubations in this patient population.

Cochrane Library
Cochrane Database of Systematic Reviews

Cochrane 2012

Ketamine for management of acute exacerbations of asthma in children (Review)

Jat KR, Chawla D

Implications for practice

The single study on non-intubated children did not show [illegible] icant benefit and does not support the case studies and ob[illegible] tional reports showing benefits of ketamine in both non-ven[illegible] and ventilated children. There were no significant side eff[illegible] ketamine in the single, small study included in this revie[illegible] could not find any trials on ventilated children.

Implications for research

To prove that ketamine is an effective treatment for acute a[illegible] in children, there is need for a sufficiently powered rando[illegible] trial of high methodological quality with objective outcom[illegible] sures of clinical importance. Future trials should also explo[illegible] ferent doses of ketamine and its role in children needing v[illegible] tion because of severe acute asthma.

Jat KR, Chawla D.
Ketamine for management of acute exacerbations [illegible]
Cochrane Database of Systematic Reviews 2012, Issue 11. Art. No.: CD010293.
DOI: 10.1002/14651858.CD010293.pub2.

www.cochranelibrary.com

WILE

FALTA EVIDENCIA...

Termine, MUCHAS GRACIAS

pedrorino@hotmail.com

prino@garrahan.gov.ar