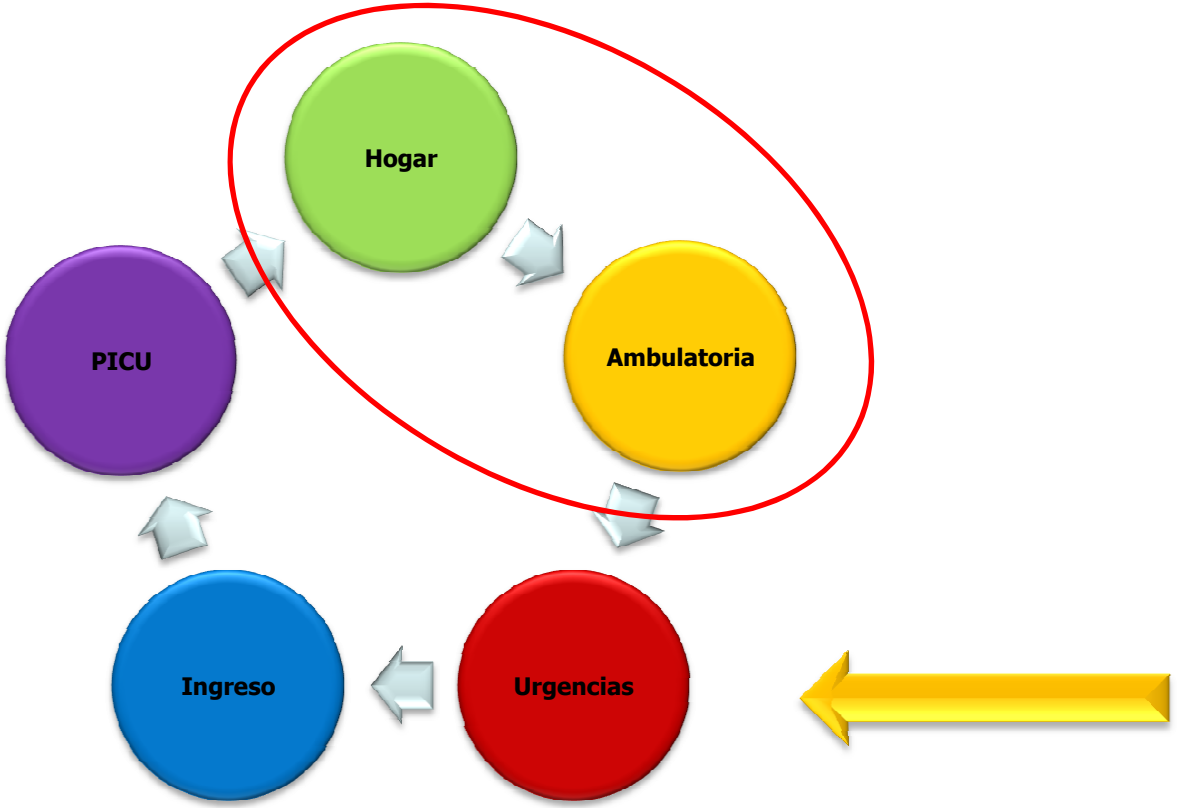
Crisis Asmática en la Urgencia Pediátrica

Javier González del Rey, MD, MEd
Profesor de Pediatría
Cincinnati Children's Hospital Medical Center
Director Asociado, División Urgencias Pediátricas
Director, Programa de Residencia Pediátrica

change the outcome®

Cincinnati Children's Hospital Medical Center

Asma en Pediatría



change the outcome®

Cincinnati Children's Hospital Medical Center

change the outcome®

Cincinnati Children's Hospital Medical Center

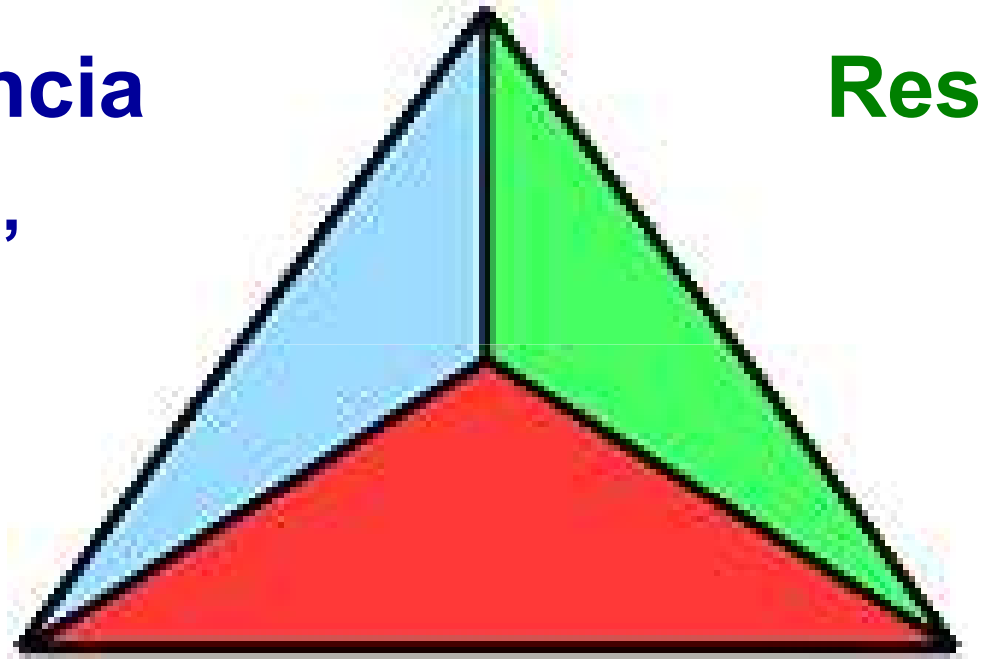
Un Domingo Cualquiera…

- Niño de 4 años que desde hace 2 horas presenta tos seca, dificultad respiratoria leve...
- Está tranquilo, presenta retracciones intercostales y el color es normal…
- Se le toman las constantes (tª 37,5ºC, FR 28 rpm, FC 120 lpm, Sat Ox 96%) ...

Triángulo de Evaluación Pediátrica (APLS)

Apariencia

"normal"



Respiración

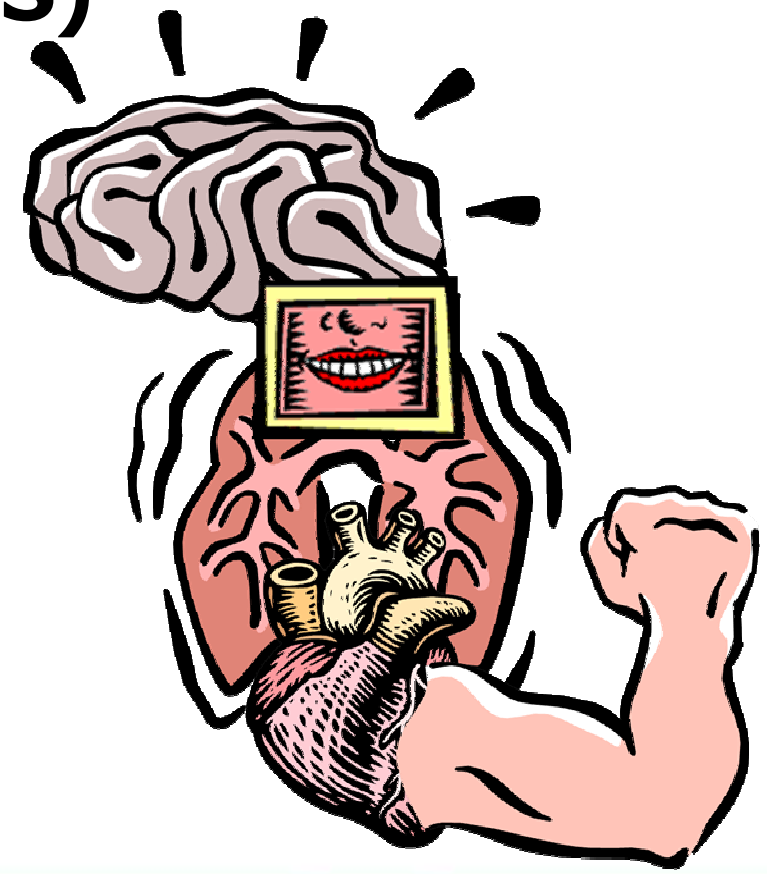
"dificultad respiratoria leve"

Circulación

"normal"

Evaluación Cardiopulmonar Rápida (RCPA -PALS)

- Nivel de Conciencia
- Vías Aéreas
- Respiración
- Circulación:
  - Frecuencia Cardíaca
  - Pulsos
    - ✓ Centrales
    - ✓ Periféricos
  - Color
  - Temperatura
  - Llenado Capilar



Escalas Clínicas

Severity Assessment		
Mild	**Moderate**	**Severe**
Talks in sentences	Talks in phrases	Talks in single words
Normal mental status	Mildly anxious	Anxious
Mild tachypnea	Moderate tachypnea	Severe tachypnea
No or minimal ↑ WOB	Moderate ↑ WOB	Severe ↑ WOB
Good aeration	Fair aeration	Poor aeration
End expiratory wheeze	Loud expiratory wheeze	Inspiratory and expiratory wheezing ("tight")
Pulse-Ox > 95%	Pulse-Ox = 90%-95%	Pulse-Ox < 90%
PEFR ≥ 70%	PEFR = 40%-69%	PEFR < 40%

EPR-3 Guidelines on Asthma. NAEPP, NHLBI 2007

Formal Evaluation of Asthma Exacerbation Severity in ED or Urgent Care Setting

	Mild	Moderate	Severe	Subset: Respiratory Arrest Imminent
Symptoms				
Breathlessness	While walking Can lie down	While at rest (infant: softer, shorter cry, difficulty feeding) Prefers sitting	While at rest (infant: stops feeding) Sits upright	While at rest
Talks in	Sentences	Phrases	Words	Cannot talk
Alertness	Normal or may be agitated	Usually agitated	Usually agitated	Drowsy or confused
Signs				
Respiratory rate	Normal or increased	Increased	Increased, often >30/minute	Normal or decreased
	Guide to rates of breathing in awake children: *Age* — *Normal Rate* < 2 months — < 60/minute 2 to 12 months — < 50/minute 1 to 5 years — < 40/minute 6 to 8 years — < 30/minute			
Use of accessory muscles; suprasternal retractions; nasal flaring; abdominal breathing	Usually not	Commonly	Usually	Paradoxical thoracoabdominal movement
Wheeze	Moderate, often only end expiratory	Loud; throughout exhalation	Loud, throughout inspiration and exhalation or may be absent	Minimal or absent
Pulse/minute (at initial presentation)	< 100	100 to 120	> 120	Bradycardia
Pulsus paradoxus	Absent <10 mmHg	May be present 10 to 25 mmHg	Often present > 25 mmHg (adult) 20 to 40 mmHg (child)	Absence suggests respiratory muscle fatigue
Functional Assessment				
PEF (peak expiratory flow) Percent predicted or percent personal best	≥ 70%	Approx. 40 to 69% or Response to treatment lasts < 2 hours	< 40%	< 25% Note: PEF testing may not be needed in very severe attacks
PaO_2 (arterial oxygen pressure, on room air) and/or	Normal (test not usually necessary)	≥ 60 mmHg (test not usually necessary)	< 60 mmHg: possible cyanosis	
PCO_2 (partial pressure of carbon dioxide)	< 42 mmHg (test not usually necessary)	< 42 mmHg (test not usually necessary)	≥ 42 mmHg: possible respiratory failure	
SaO_2 (oxygen saturation) (on room air) at sea level	> 95%	90 to 95%	< 90%	
	Hypercapnia (hypoventilation) develops more easily in young children than in adolescents and adults.			

- The presence of several parameters, but not necessarily all, indicates the general classification of the exacerbation
- Many of these parameters have not been systematically studied, especially as they correlate with each other and thus serve only as general guides

Adapted from the National Heart Blood and Lung Institute, National Education and Prevention Program Expert Panel Report 3: *Diagnosis and Management of Asthma, 2007 (LocalConsensus [5], NAEPP 2007 [5a]).*

Escalas Clínicas…En Pocas Palabras

Puntuación = 7 → Grave

Puntuación	Frecuencia Respiratoria		Sibilancias	Retracciones
n	≤ 6 años	≥ 6 años		(Actividad Esternocleidomastoideo)
0	< 30	< 20	No	No
1	31 – 45	21 – 35	Final espiración (estetoscopio)	Dudoso incremento
2	46 – 60	36 – 50	Toda la espiración (estetoscopio)	Incremento aparente
3	> 60	> 50	Inspiración y espiración, sin estetoscopio*	Actividad máxima

*Sin sibilancias pero con retracciones – "3"

Escalas Clínicas…En Pocas Palabras

Puntuación = 7 → Grave

Puntuación	Frecuencia Respiratoria		Sibilancias	Retracciones
n	≤ 6 años	≥ 6 años		(Actividad Esternocleidomastoideo)
0	< 30	< 20	No	No
1	31 – 45	21 – 35	Final espiración (estetoscopio)	Dudoso incremento
2	46 – 60	36 – 50	Toda la espiración (estetoscopio)	Incremento aparente
3	> 60	> 50	Inspiración y espiración, sin estetoscopio*	Actividad máxima

*Sin sibilancias pero con retracciones – "3"

Escalas Clínicas… De Severidad

Parámetro	Score clínico	Sat Ox	PEF
Leve	0-3	> 94 %	> 70%
Moderado	4-6	90-94%	30-70%
Grave	7-9	< 90%	< 30%

change the outcome®

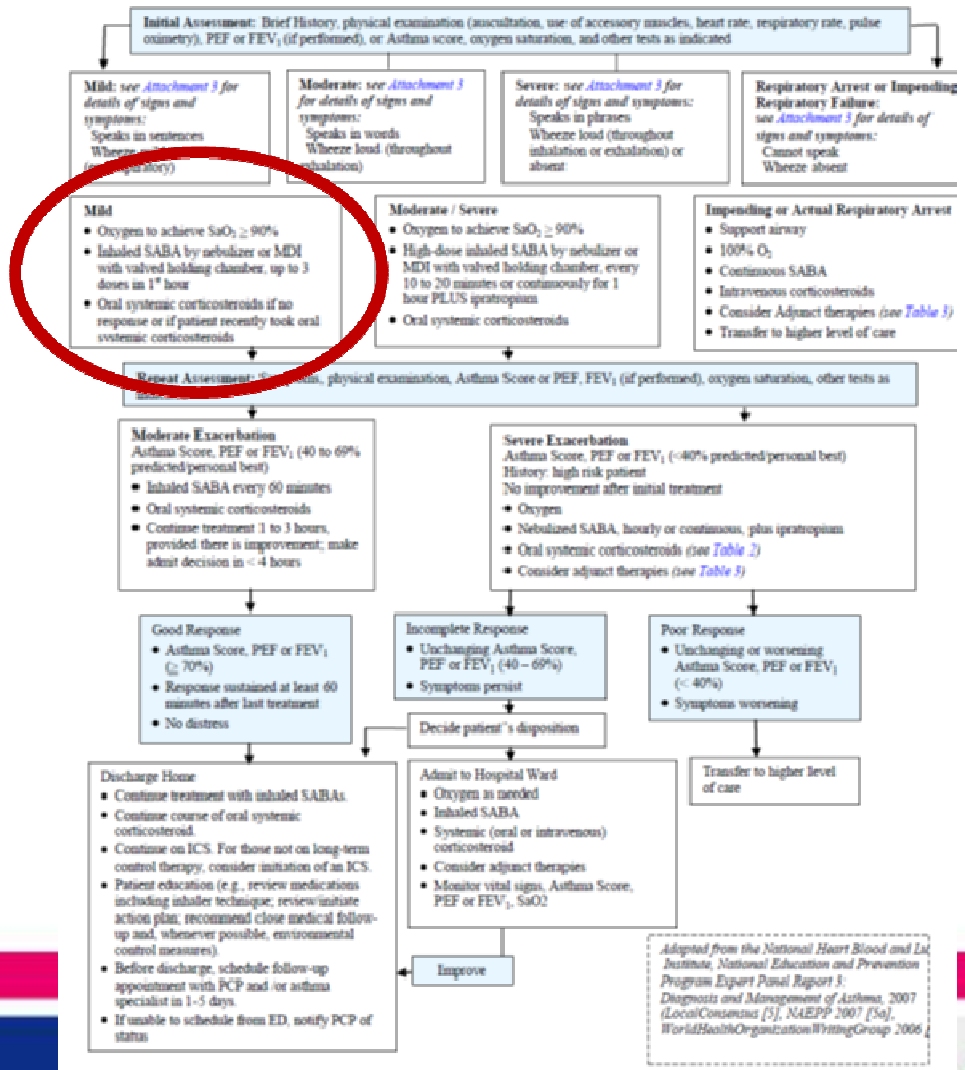
Cincinnati Children's Hospital Medical Center

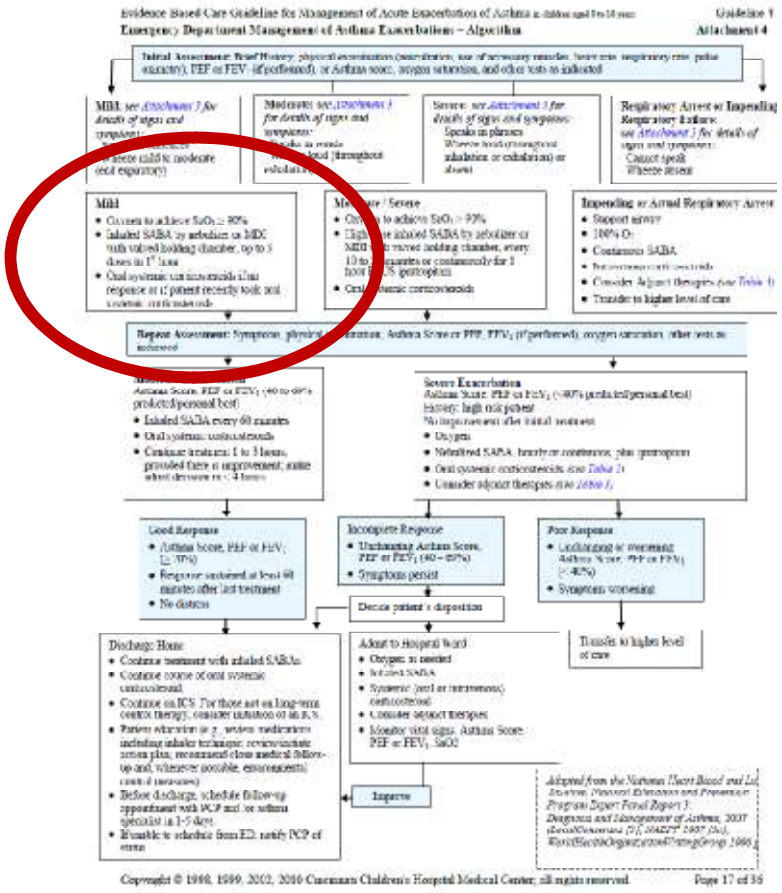
Escalas Clínicas… De Severidad

Parámetro	Score clínico	Sat Ox	PEF
Leve	0-3	> 94 %	> 70%
Moderado	4-6	90-94%	
Grave	7-9	< 90%	< 30%

Evidence-Based Care Guideline for Management of Acute Exacerbation of Asthma in children aged 0 to 18 years — Guideline 4

Emergency Department Management of Asthma Exacerbations – Algorithm — Attachment 4





Leve...

- Oxígeno
- Albuterol Neb o MDI (3 dosis / hora)
- Considerar Prednisolona 1 mg/kg por 5 días
- Observación
- Alta
  - Beta Agonistas
  - Corticoides
  - Considerar Terapia Control
- Educación

Urgencias Pediátricas Hospital Cruces

LEVE
E. Clínica 1-3
PFEM > 70%
Sat Ox > 94%

VALORACIÓN GRAVEDAD CRISIS ASMÁTICA
- **Escala clínica**
- **Pico flujo espiratorio máximo**
- **Saturación de Oxígeno**

FALLO RESPIRATORIO
Cianosis
Alteración de conciencia

*Considerar Salbutamol MDI (1-2 dosis):
Nº pufs = peso/3 (min 5 puff; max 10 puff)

MODERADA-GRAVE
- E. Clínica > 3
- PFEM < 70%
- SO <94%

ESTABILIZAR
*ABCs (Semincorporado – valorar SRI; Oxigenoterapia; Monitorización; Acceso venoso)
*Adrenalina, salbutamol o terbutalina SC 0,01 mg/kg
*Salbutamol nebulización continua
*Metilprednisolona IV 1-2 mg/kg
*Sulfato de magnesio IV 25-50 mg/kg
*Valorar traslado a UCIP

ALTA
* β-2-adrenérgico
< 5 años salbutamol MDI 5 puff/dosis a demanda (mínimo cada 2-4 horas)
≥ 5 años salbutamol MDI 5 puff/dosis a demanda (mínimo cada 2-4 horas) o salbutamol/terbutalina en dispositivo de polvo seco a demanda 1-2 inh/dosis
*Considerar prednisona oral 1-2 mg/kg/día, 4-5 días. Siempre en crisis moderadas
*Valorar inicio de corticoides inhalados

*Oxigenoterapia
*Salbutamol neb o MDI
Salbutamol neb a demanda:
< 20 kg 2,5 mg
≥ 20 kg 5 mg
Salbutamol MDI a demanda:
Nº pufs = peso/3 (min 5 puff; max 10 puff)
*Ipratropio neb 250 µgr o MDI 4 puff (3 tandas asociado a salbutamol) si:
•E,Clínica > 4
•PFEM < 50%
•Sat O2 < 91%
*Prednisona oral o IV 1-2 mg/kg (1ª dosis)
*Si $SatO_2$ inicial < 91% deberá permanecer al menos unas horas en la UO de urgencias

INGRESO
*Salbutamol neb o MDI
Salbutamol neb a demanda:
< 20 kg 2,5 mg
≥ 20 kg 5 mg
Salbutamol MDI a demanda:
Nº pufs = peso/3 (min 5 puff; max 10 puff)
*Prednisona oral o IV 1-2 mg/kg/día en 3 dosis
*Valorar Sulfato de magnesio IV 25-50 mg/kg)
*Valorar Teofilina IV 5 mg/kg/6 horas (B)
*Valorar Rx Tórax

Neb=nebulizado
MDI=inhalador presurizado con espaciador

* Valorar **hospitalización** si no mejoría en 24 horas
* Valorar **UCIP** si empeoramiento

Cincinnati Children's Hospital Medical Center

change the outcome®

Cincinnati Children's Hospital Medical Center

Nebulización vs MDI-S

- Ventajas Nebulizador
  - Oxígeno húmedo
  - No se necesita coordinación
  - Dosis mejor establecida

- Ventajas MDI-S
  - Más eficiente
  - Portable
  - Tiempo menor de administración
  - Costo menor de personal
  - Menos contaminación

The Cochrane Library

- Revisión Cochrane
  - 25 Estudios con 2295 pacientes (3 a 18 años)
  - Tratados con MDI-S menos tiempo en Urgencias
  - Sin diferencias en el numero de ingresos
  - Resultados similares
- Reducción de Costo con MDI- S

Cates CJ. Cochrane Database 2009

Doan Q, Pediatrics 2011

MDI- S .. ¿Qué Cantidad?

- NHLBI 2007 — 4 – 8 (cada 20 minutos)
- Children's Mercy Hospital — < 5 años 4 — > 5 años 8
- Royal Children's Hospital Australia — < 6 años 6 — > 6 años 12

En Nuestro Centro…

Peso (Kg)	Nebulización	MDI-S
< 10	2.5 mg (0.5 ml)	4
10 - 20	3.75 mg (0.75 ml)	6
> 20	5 mg (1 ml)	8

En Nuestro Centro…

Table 1: Aerosolized Therapies - Drugs and Dosage Recommendations

Aerosolized Therapies			
Medication (formulation)	**Child Dose***	**Adolescent Dose**	**Notes**
Inhaled Short-Acting Beta$_2$-Agonists (SABA)			
Albuterol Nebulizer solution (2.5 mg/3mL, 5 mg/mL)	2.5 to 5 mg every 20 minutes for 3 doses, then 2.5 to 5 mg every 1 to 4 hours as needed 0.5 mg/kg/hour by continuous nebulization < 30 kg: 2.5 mg ≥ 30 kg: 5 mg	2.5 to 5 mg every 20 minutes for 3 doses, then 2.5 to 10 mg every 1 to 4 hours as needed, or 10 to 15 mg/hour continuously	For optimal delivery, dilute aerosols to minimum of 3 mL at gas flow of 6 to 8 L/min. Use large volume nebulizers for continuous administration. May mix with ipratropium nebulizer solution.
MDI (90 mcg/puff)	6 puffs (range: 4 to 8 puffs) every 20 minutes for 3 doses, then every 1 to 4 hours as needed	6 puffs (range: 4 to 8 puffs) every 20 minutes up to 4 hours, then every 1 to 4 hours as needed	In mild to moderate exacerbations, MDI plus VHC (see recommendation 7) is as effective as nebulized therapy with appropriate administration technique. Add mask in children unable to manage an MDI device.
Levalbuterol (R-albuterol) Nebulizer solution (0.31mg/3 mL, 0.63 mg/3 mL, 1.25 mg/0.5mL, 1.25 mg/3 mL)	0.075 mg/kg (minimum dose 1.25 mg) every 20 minutes for 3 doses, then 0.075 to 0.15 mg/kg (not to exceed 2.5 mg) every 1 to 4 hours as needed	1.25 to 2.5 mg every 20 minutes for 3 doses, then 1.25 to 5 mg every 1 to 4 hours as needed	See Recommendation 6 of this guideline regarding levalbuterol.
MDI (45 mcg/puff)	See albuterol MDI dose above.	See albuterol MDI dose Above.	

Albuterol vs. Levalbuterol (Xoponex)

Ralston 2005	Qureshi 2005	Hardasmalani 205
N = 140	N= 129	N = 70
Leve a Moderado	Moderado a Severo	Leve a Moderado
Tiempo en Urgencias	Escala de Severidad	Frecuencia Respiratoria + PEF
Ingreso base de 1.4%	Ingreso base de 13%	Ingreso base de 6%
Sin Diferencia	Sin Diferencia	Sin Diferencia

"2.5 mg de Albuterol equivale a 1.25 mg de Levalbuterol con efectos secundarios similares – Sin diferencia en Hospitalización y efectos adversos"

Wilkinson M – J Asthma 2011

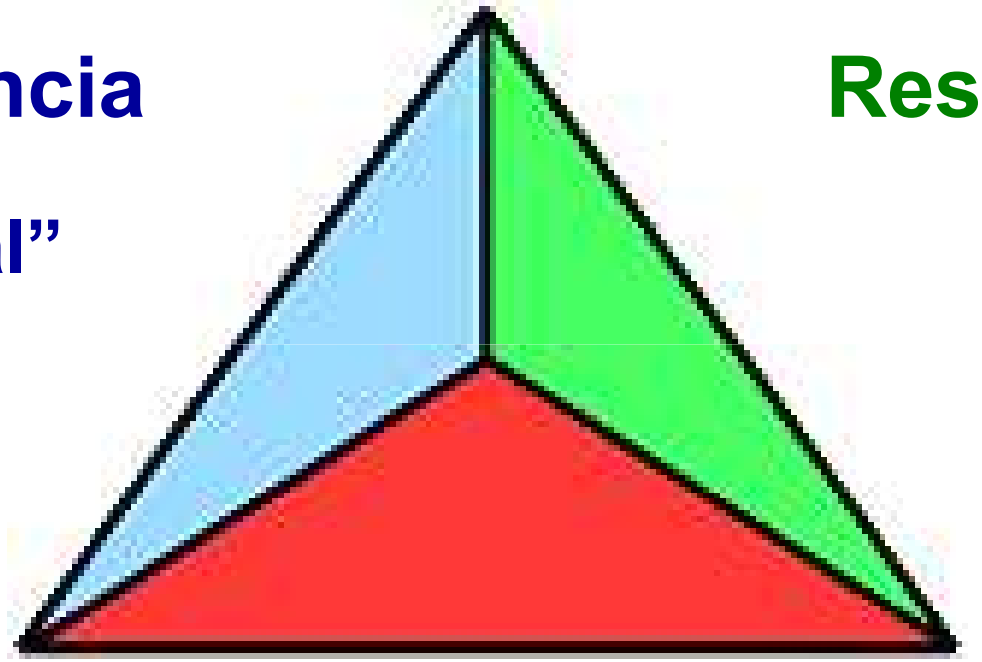
Un Domingo Cualquiera…

- Niño de 4 años que desde hace 2 horas presenta tos seca, dificultad respiratoria moderada...
- Está ansioso, presenta retracciones supraesternales e intercostales y el color es normal…
- Se le toman las constantes (tª 37,5ºC, FR 36 rpm, FC 140 lpm, Sat Ox 93%) ...

Triángulo de Evaluación Pediátrica (APLS)

Apariencia

"anormal"



Respiración

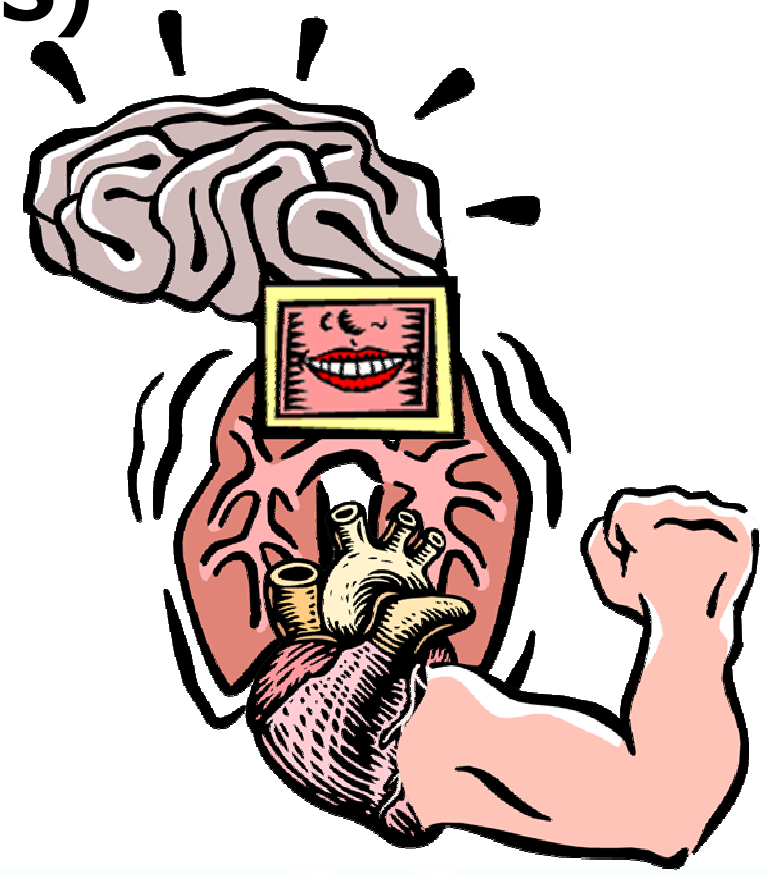
"dificultad respiratoria moderada"

Circulación

"normal"

Evaluación Cardiopulmonar Rápida (RCPA -PALS)

- Nivel de Conciencia
- Vías Aéreas
- Respiración
- Circulación:
  - Frecuencia Cardíaca
  - Pulsos
    - ✓ Centrales
    - ✓ Periféricos
  - Color
  - Temperatura
  - Llenado Capilar



Escalas Clínicas…En Pocas Palabras

Puntuación = 7 → **Grave**

Puntuación	Frecuencia Respiratoria		Sibilancias	Retracciones
n	≤ 6 años	≥ 6 años		(Actividad Esternocleidomastoideo)
0	< 30	< 20	No	No
1	31 – 45	21 – 35	Final espiración (estetoscopio)	Dudoso incremento
2	46 – 60	36 – 50	Toda la espiración (estetoscopio)	Incremento aparente
3	> 60	> 50	Inspiración y espiración, sin estetoscopio*	Actividad máxima

*Sin sibilancias pero con retracciones – "3"

Escalas Clínicas… De Severidad

Parámetro	Score clínico	Sat Ox	PEF
Leve	0-3	> 94 %	> 70%
Moderado	4-6	90-94%	30- o
Grave	7-9	< 90%	< 30%

change the outcome®

Cincinnati Children's Hospital Medical Center

Evidence-Based Care Guideline for Management of Acute Exacerbation of Asthma in children aged 0 to 18 years — Guideline 4

Emergency Department Management of Asthma Exacerbations – Algorithm — Attachment 4

Initial Assessment: Brief History, physical examination (auscultation, use of accessory muscles, heart rate, respiratory rate, pulse oximetry), PEF or FEV_1 (if performed), or Asthma score, oxygen saturation, and other tests as indicated

Mild: *see Attachment 3 for details of signs and symptoms:*
Speaks in sentences
Wheeze: mild to moderate (end expiratory)

Moderate: *see Attachment 3 for details of signs and symptoms:*
Speaks in words
Wheeze loud (throughout exhalation)

Severe: *see Attachment 3 for details of signs and symptoms:*
Speaks in phrases
Wheeze loud (throughout [illegible] or exhalation) or absent

Respiratory Arrest or Impending Respiratory Failure:
see Attachment 3 for details of signs and symptoms:
Cannot speak
Wheeze absent

Mild
- Oxygen to achieve $SaO_2 \geq 90\%$
- Inhaled SABA by nebulizer or MDI with valved holding chamber, up to 3 doses in 1st hour
- Oral systemic corticosteroids if no response or if patient recently took oral systemic corticosteroids

Moderate / Severe
- Oxygen to achieve $SaO_2 \geq 90\%$
- High-dose inhaled SABA by nebulizer or MDI with valved holding chamber, every 10 to 20 minutes or continuously for 1 hour PLUS ipratropium
- Oral systemic corticosteroids

Impending or Actual Respiratory Arrest
- Support airway
- 100% O_2
- Continuous SABA
- Intravenous corticosteroids
- Consider Adjunct therapies *(see Table 3)*
- Transfer to higher level of care

Repeat Assessment: Symptoms, physical examination, Asthma Score or PEF, FEV_1 (if performed), oxygen saturation, other tests as indicated

Moderate Exacerbation
Asthma Score, PEF or FEV_1 (40 to 69% predicted/personal best)
- Inhaled SABA every 60 minutes
- Oral systemic corticosteroids
- Continue treatment 1 to 3 hours, provided there is improvement; make admit decision in < 4 hours

Severe Exacerbation
Asthma Score, PEF or FEV_1 (<40% predicted/personal best)
History: high risk patient
No improvement after initial treatment
- Oxygen
- Nebulized SABA, hourly or continuous, plus ipratropium
- Oral systemic corticosteroids *(see Table 2)*
- Consider adjunct therapies *(see Table 3)*

Good Response
- Asthma Score, PEF or FEV_1 ($\geq$ 70%)
- Response sustained at least 60 minutes after last treatment
- No distress

Incomplete Response
- Unchanging Asthma Score, PEF or FEV_1 (40 – 69%)
- Symptoms persist

Poor Response
- Unchanging or worsening Asthma Score, PEF or FEV_1 (< 40%)
- Symptoms worsening

Decide patient's disposition

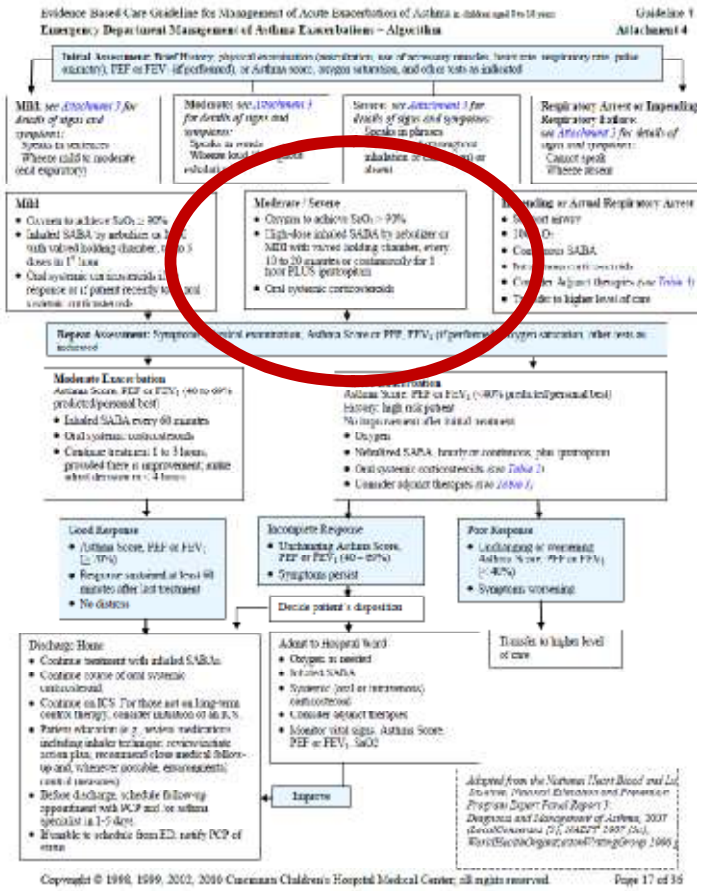
Discharge Home
- Continue treatment with inhaled SABAs.
- Continue course of oral systemic corticosteroid.
- Continue on ICS. For those not on long-term control therapy, consider initiation of an ICS.
- Patient education (e.g., review medications including inhaler technique; review/initiate action plan; recommend close medical follow-up and, whenever possible, environmental control measures).
- Before discharge, schedule follow-up appointment with PCP and /or asthma specialist in 1-5 days.
- If unable to schedule from ED, notify PCP of status

Admit to Hospital Ward
- Oxygen as needed
- Inhaled SABA
- Systemic (oral or intravenous) corticosteroid
- Consider adjunct therapies
- Monitor vital signs, Asthma Score, PEF or FEV_1, SaO2

Improve

Transfer to higher level of care

Adapted from the National Heart Blood and Lung Institute, National Education and Prevention Program Expert Panel Report 3: Diagnosis and Management of Asthma, 2007 (LocalConsensus [5], NAEPP 2007 [5a], WorldHealthOrganizationWritingGroup 2006



Moderada…

- Oxígeno
- Albuterol Neb o MDI (10 – 20 min)
- Ipratropium
- Prednisolona 1 mg/kg
- Observación
- Alta
  - Beta Agonistas
  - Corticoides por 5 días
  - Terapia Control
- Educación

Urgencias Pediátricas Hospital Cruces

VALORACIÓN GRAVEDAD CRISIS ASMÁTICA

- **Escala clínica**
- **Pico flujo espiratorio máximo**
- **Saturación de Oxígeno**

LEVE
E. Clínica 1-3
PFEM > 70%
Sat Ox > 94%

*Considerar Salbutamol MDI (1-2 dosis):
Nº pufs = peso/3 (min 5 puff; max 10 puff)

ALTA
* β-2-adrenérgico
< 5 años salbutamol MDI 5 puff/dosis a demanda (mínimo cada 2-4 horas)
≥ 5 años salbutamol MDI 5 puff/dosis a demanda (mínimo cada 2-4 horas) o salbutamol/terbutalina en dispositivo de polvo seco a demanda 1-2 inh/dosis
*Considerar prednisona oral 1-2 mg/kg/día, 4-5 días. Siempre en crisis moderadas
*Valorar inicio de corticoides inhalados

Neb=nebulizado
MDI=inhalador presurizado con espaciador

MODERADA-GRAVE
- E. Clínica > 3
- PFEM < 70%
- SO <94%

Oxigenoterapia
*Salbutamol neb o MDI
Salbutamol neb a demanda:
< 20 kg 2,5 mg
≥ 20 kg 5 mg
Salbutamol MDI a demanda:
Nº pufs = peso/3 (min 5 puff; max 10 puff)
*Ipratropio neb 250 µgr o MDI 4 puff (3 tandas asociado a salbutamol) si:
- E,Clínica > 4
- PFEM < 50%
- Sat O2 < 91%

*Prednisona oral o IV 1-2 mg/kg (1ª dosis)
*Si $SatO_2$ inicial < 91% deberá permanecer al menos unas horas en la UO de urgencias

FALLO RESPIRATORIO
Cianosis
Alteración de conciencia

ESTABILIZAR
*ABCs (Semincorporado – valorar SRI; Oxigenoterapia; Monitorización; Acceso venoso)
*Adrenalina, salbutamol o terbutalina SC 0,01 mg/kg
*Salbutamol nebulización continua
*Metilprednisolona IV 1-2 mg/kg
*Sulfato de magnesio IV 25-50 mg/kg
*Valorar traslado a UCIP

INGRESO
*Salbutamol neb o MDI
Salbutamol neb a demanda:
< 20 kg 2,5 mg
≥ 20 kg 5 mg
Salbutamol MDI a demanda:
Nº pufs = peso/3 (min 5 puff; max 10 puff)
*Prednisona oral o IV 1-2 mg/kg/día en 3 dosis
*Valorar Sulfato de magnesio IV 25-50 mg/kg)
*Valorar Teofilina IV 5 mg/kg/6 horas (B)
*Valorar Rx Tórax

* Valorar **hospitalización** si no mejoría en 24 horas
* Valorar **UCIP** si empeoramiento

Cincinnati Children's Hospital Medical Center

Crisis Asmática Moderada

- Ipratropium
- Corticoides
  - Oral
  - IM
  - Inhalados

Expertos en Paraguay!!...

J Asthma. 2011 Apr;48(3):298-303. doi: 10.3109/02770903.2011.555037. Epub 2011 Feb 21.

Inhaled salbutamol plus ipratropium in moderate and severe asthma crises in children.

Iramain R[1], López-Herce J, Coronel J, Spitters C, Guggiari J, Bogado N.

Author information

Abstract

BACKGROUND: The combination of inhaled β(2) agonists and anticholinergics is recommended for children with acute asthma, although there are few randomized controlled trials. The aim of the study was to determine whether salbutamol plus ipratropium bromide improves oxygenation and lung function and reduces the frequency of hospitalization in children with asthma crises.

METHODS: A prospective, randomized, double-blind study of children aged 2-18 years with moderate to severe asthma crises. Patients were evaluated using the asthma score and spirometry. They received six nebulizations of salbutamol plus placebo or salbutamol plus ipratropium and were reevaluated at 30, 60, 90, 120, and 240 minutes, at which time it was decided whether they were to be admitted.

RESULTS: A total of 97 patients completed the study, 49 in the salbutamol plus ipratropium group and 48 in the salbutamol-only group. There were no differences in the status at baseline between the two groups. Children treated with salbutamol plus ipratropium presented a greater improvement in clinical state and lung function and required hospitalization less frequently (18.4%) than children in the salbutamol group (43.8%) (p = .007). Improvement was more marked in children with severe asthma crises than in those with moderate crises. The effect of salbutamol plus ipratropium was similar in children over 8 years of age and in younger children.

CONCLUSIONS: Salbutamol plus ipratropium bromide improves lung function in asthmatic children with moderate to severe asthma crises, independently of age. The effect is greater in children with severe crises, with a substantial reduction in the need for hospitalization.

Ipratropium Bromide (Atrovent) Recomendaciones

- Use en crisis moderadas y severas
- 500 mcg con nebulizaciones iniciales de Beta Agonistas (< 10 Kg: 250 mcg)
- Por lo general en tratamiento de Urgencias

Crisis Asmática Moderada

- Ipratropium 
- Corticoides
  - Oral
  - IM
  - Inhalados

Corticoides Sistémicos

- Oral = EV o IM.
- Prednisona 1-2 mg/kg día (max 60 mg) durante 5 días.
- No es necesaria la reducción paulatina si < 7 días.
- Reducción de recaídas en los 21 días posteriores.
- Utilidad en preescolares con crisis secundaria a infección viral en duda

Intravenous Versus Oral Corticosteroids in the Management of Acute Asthma in Peter LJ, MBBS, MSc*, Grace L Caputo x Grace L Caputo,, MD, MPH*, Marc Baskin, MD*‡, Nathan Kuppermann, MD, MPH*

High-Dose Inhaled Fluticasone Does Not Replace Oral Prednisolone in Children With Mild to Moderate Acute Asthma

Suzanne Schuh, Paul T. Dick, Derek Stephens, Marlene Hartley, Svetlana Khaikin, Lisa Rodrigues and Allan L. Coates

Pediatrics 2006;118;644-650

- 69 niños (5 – 17 años) crisis asma leve – mod (FEV1, 50 – 75%)
- Dos grupos:

Reconsultas 48 h:

Fluticasona: 12.5%

Prednisona: 0%

240 min, mean ± SD ($n = 60$)	82.1 ± 18.6	91.3 ± 15.4	
Estimated mean difference (95% CI)			10.6 (4.0 to 17.2)
P[a]			0.001
48 h, mean ± SD ($n = 66$)	87.6 ± 13.7	90.3 ± 14.4	
Estimated mean difference (95% CI)			4.0 (−2.8 to 10.8)
P[a]			0.14
Day 6 ($n = 67$)	96.6 ± 18.1	98.4 ± 14.2	
Mean difference, ± SD (95% CI)			3.4 ± 19.1 (−12.8 to 5.9)
P[a]			0.467

[a] P values refer to significance with respect to relevant differences.

De ral

- D
- P
- I de s
- M

4 estudios más, 2 de ellos publicados en 2012:

"1 o 2 dosis de Dexametasona equivalente a 3- 5 días Prednisona"

9:20-6

change the outcome®

Cincinnati Children's® Hospital Medical Center

Un Domingo Cualquiera…

- Niño de 4 años que desde hace 2 horas presenta tos seca, dificultad respiratoria marcada, pocas palabras...
- Está ansioso, presenta retracciones supraesternales e intercostales y el color es pálido…
- Se le toman las constantes (tª 37,5ºC, FR 52 rpm, FC 140 lpm, Sat Ox 90%) ... Poco movimiento de aire!

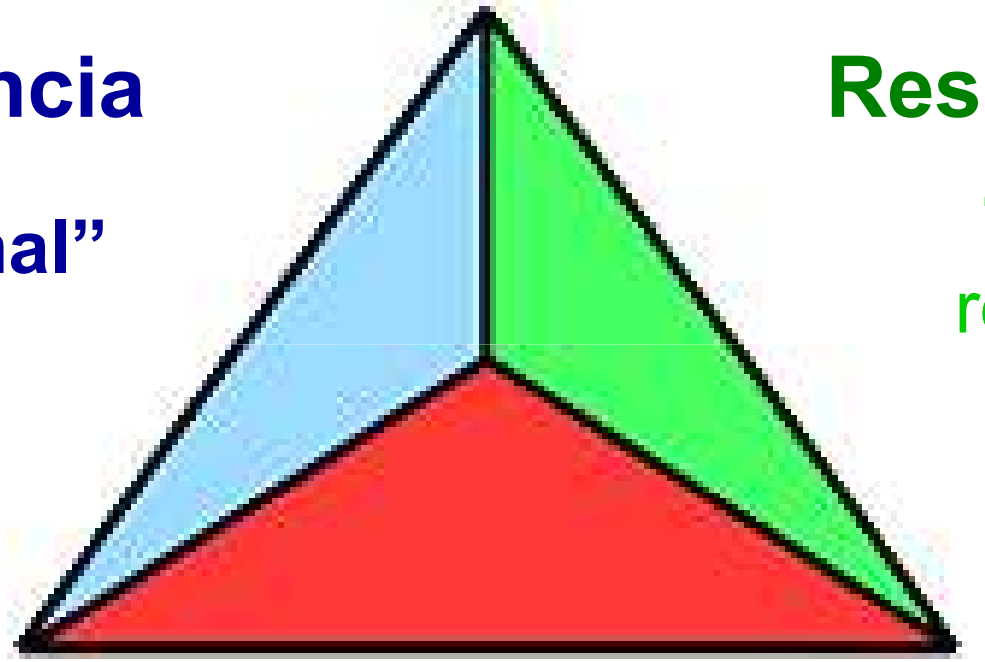
change the outcome®

Cincinnati Children's Hospital Medical Center

Triángulo de Evaluación Pediátrica (APLS)

Apariencia

"anormal"



Respiración

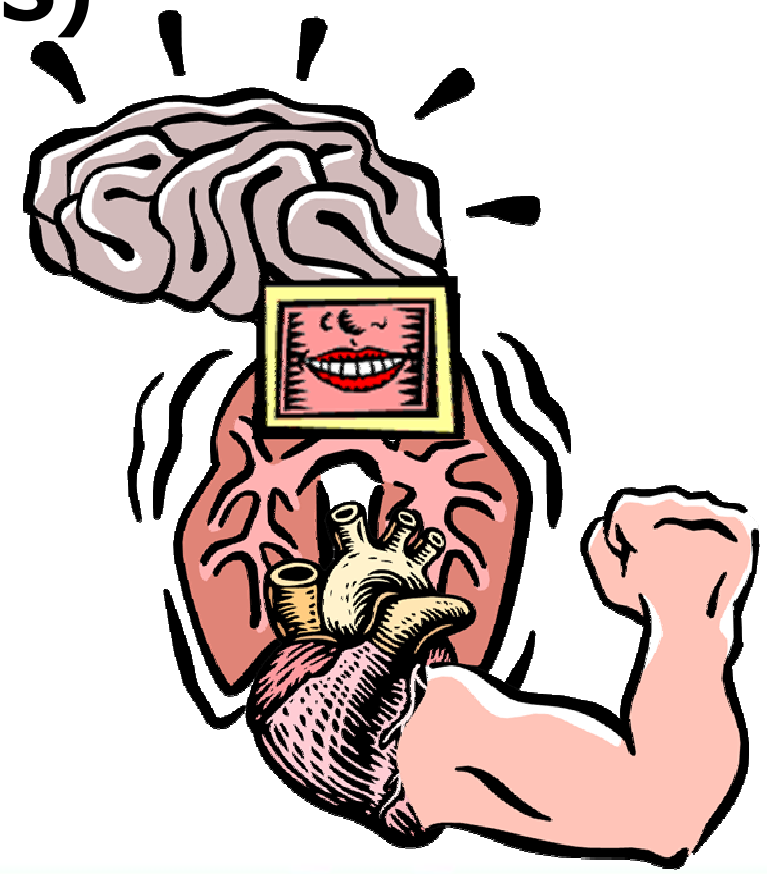
"dificultad respiratoria severa"

Circulación

"normal"

Evaluación Cardiopulmonar Rápida (RCPA -PALS)

- Nivel de Conciencia
- Vías Aéreas
- Respiración
- Circulación:
  - Frecuencia Cardíaca
  - Pulsos
    - ✓ Centrales
    - ✓ Periféricos
  - Color
  - Temperatura
  - Llenado Capilar



Escalas Clínicas…En Pocas Palabras

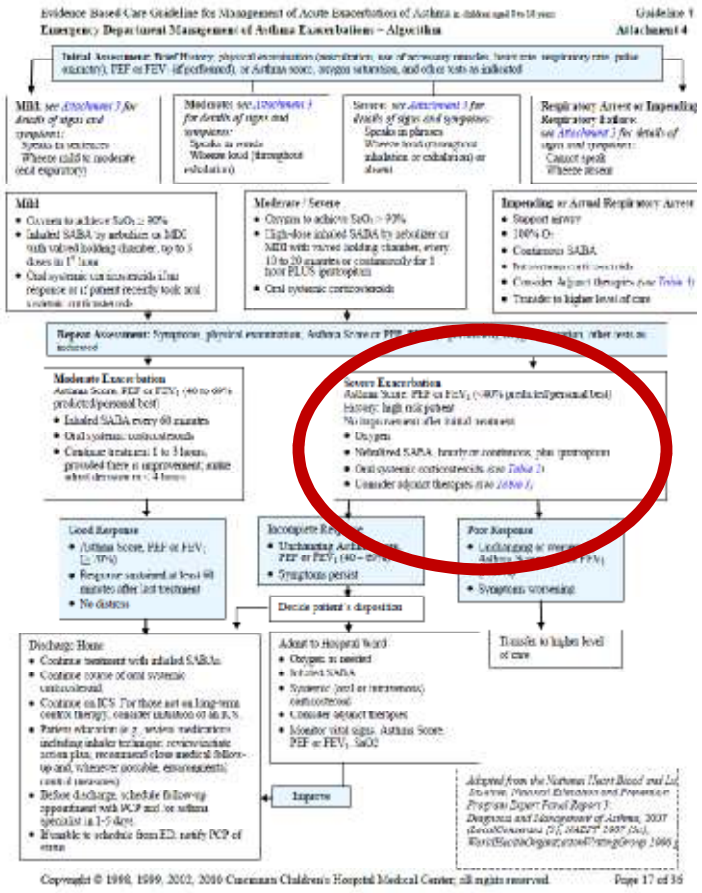
Puntuación = 7 → **Grave**

Puntuación	Frecuencia Respiratoria		Sibilancias	Retracciones
n	≤ 6 años	≥ 6 años		(Actividad Esternocleidomastoideo)
0	< 30	< 20	No	No
1	31 – 45	21 – 35	Final espiración (estetoscopio)	Dudoso incremento
2	46 – 60	36 – 50	Toda la espiración (estetoscopio)	Incremento aparente
3	> 60	> 50	Inspiración y espiración, sin estetoscopio*	Actividad máxima

*Sin sibilancias pero con retracciones – "3"

Escalas Clínicas… De Severidad

Parámetro	Score clínico	Sat Ox	PEF
Leve	0-3	> 94 %	> 70%
Moderado	4-6	90-94%	30 %%
Grave	7-9	< 90%	< 30%



Severa...

- Oxigeno (Alto Flujo)
- Terbutalina vs. Epinefrina IM
- Nebulizacion Albuterol (Continua)
- Ipratropium
- Corticoides Sistemicos EV
- Sulfato de Magnesio
- Observacion – Cuido Intensivo
- En Casos muy Severos IRS – Ketamina

Urgencias Pediátricas Hospital Cruces

VALORACIÓN GRAVEDAD CRISIS ASMÁTICA

- **Escala clínica**
- **Pico flujo espiratorio máximo**
- **Saturación de Oxígeno**

LEVE
E. Clínica 1-3
PFEM > 70%
Sat Ox > 94%

*Considerar Salbutamol MDI (1-2 dosis):
Nº pufs = peso/3 (min 5 puff; max 10 puff)

ALTA
* β-2-adrenérgico
< 5 años salbutamol MDI 5 puff/dosis a demanda (mínimo cada 2-4 horas)
≥ 5 años salbutamol MDI 5 puff/dosis a demanda (mínimo cada 2-4 horas) o salbutamol/terbutalina en dispositivo de polvo seco a demanda 1-2 inh/dosis
*Considerar prednisona oral 1-2 mg/kg/día, 4-5 días. Siempre en crisis moderadas
*Valorar inicio de corticoides inhalados

Neb=nebulizado
MDI=inhalador presurizado con espaciador

MODERADA-GRAVE
- E. Clínica > 3
- PFEM < 70%
- SO <94%

*Oxigenoterapia
*Salbutamol neb o MDI
Salbutamol neb a demanda:
< 20 kg 2,5 mg
≥ 20 kg 5 mg
Salbutamol MDI a demanda:
Nº pufs = peso/3 (min 5 puff; max 10 puff)
*Ipratropio neb 250 µgr o MDI 4 puff (3 tandas asociado a salbutamol) si:
•E,Clínica > 4
•PFEM < 50%
•Sat O2 < 91%
*Prednisona oral o IV 1-2 mg/kg (1ª dosis)
*Si $SatO_2$ inicial < 91% deberá permanecer al menos unas horas en la UO de urgencias

FALLO RESPIRATORIO
Cianosis
Alteración de conciencia

ESTABILIZAR
*ABCs (Semincorporado – valorar SRI; Oxigenoterapia; Monitorización; Acceso venoso)
*Adrenalina, salbutamol o terbutalina SC 0,01 mg/kg
*Salbutamol nebulización continua
*Metilprednisolona IV 1-2 mg/kg
*Sulfato de magnesio IV 25-50 mg/kg
*Valorar traslado a UCIP

INGRESO
*Salbutamol neb o MDI
Salbutamol neb a demanda:
< 20 kg 2,5 mg
≥ 20 kg 5 mg
Salbutamol MDI a demanda:
Nº pufs = peso/3 (min 5 puff; max 10 puff)
*Prednisona oral o IV 1-2 mg/kg/día en 3 dosis
*Valorar Sulfato de magnesio IV 25-50 mg/kg)
*Valorar Teofilina IV 5 mg/kg/6 horas (B)
*Valorar Rx Tórax

* Valorar **hospitalización** si no mejoría en 24 horas
* Valorar **UCIP** si empeoramiento

Cincinnati Children's Hospital Medical Center

Crisis Asmática Severa

- Epinefrina o Terbutalina
  - Pacientes con poco movimiento de aire
  - Respuesta pobre a la nebulización
  - Pacientes muy ansiosos que no cooperan

- Epinefrina vs Terbutalina
  - (0.01 mg/ kg -0.3 vs 0.25 max)
  - Terbutalina mas selectiva con los receptores Beta
  - Menos efectos adversos
  - Mejor distribución – menos vaso constricción
  - Falta evidencia

Intermitente vs. Continuo

- Camargo CA – 2003
  - Revisión sistemática
  - 8 estudios RCT (ED – 2 Pediátricos)
  - 461 Pacientes
  - "Evidencia actual recomienda el uso de nebulización continua en pacientes con crisis asmática severa"

The Cochrane Library

Effectiveness of magnesium sulfate as initial treatment of acute severe asthma in children, conducted in a tertiary-level university hospital. A randomized, controlled trial

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

TABLE 4. *Univariate analysis*

	Treatment group n= 76	Control group n= 67	*p*-value
Need of MV	5% (n= 4)	33% (n= 22)	0.001
Length-of-stay in MV (days) α	3 (1-6)	5 (2-12)	0.087
Total hospital length-of-stay α	7 (3-12)	19 (14-29)	0.046
Length-of-stay in PICU (days) α	2 (1-4)	10 (6-18)	0.0376

α: median, interquartile range.

Sulfato de Magnesio

- Su uso IV es efectivo para prevenir hospitalizaciones en niños con crisis asmáticas moderada-graves cuando se añaden a β2 adrenérgicos y glucocorticoides (NNT 4)

- Ninguno de los 4 ensayos clínicos publicados ha revelado EA significantes, tales como hipotensión, hipotonía o alteración de los reflejos, utilizando dosis IV de 25-75 mg/kg (máximo 2 gr) en 20 min

- Su uso inhalado puede ser efectivo y seguro, pudiendo ser considerada su nebulización junto con β2 adrenérgicos, especialmente en las exacerbaciones más graves, en las cuales mejora la función pulmonar

Beta- Agonistas & Terbutalina EV?

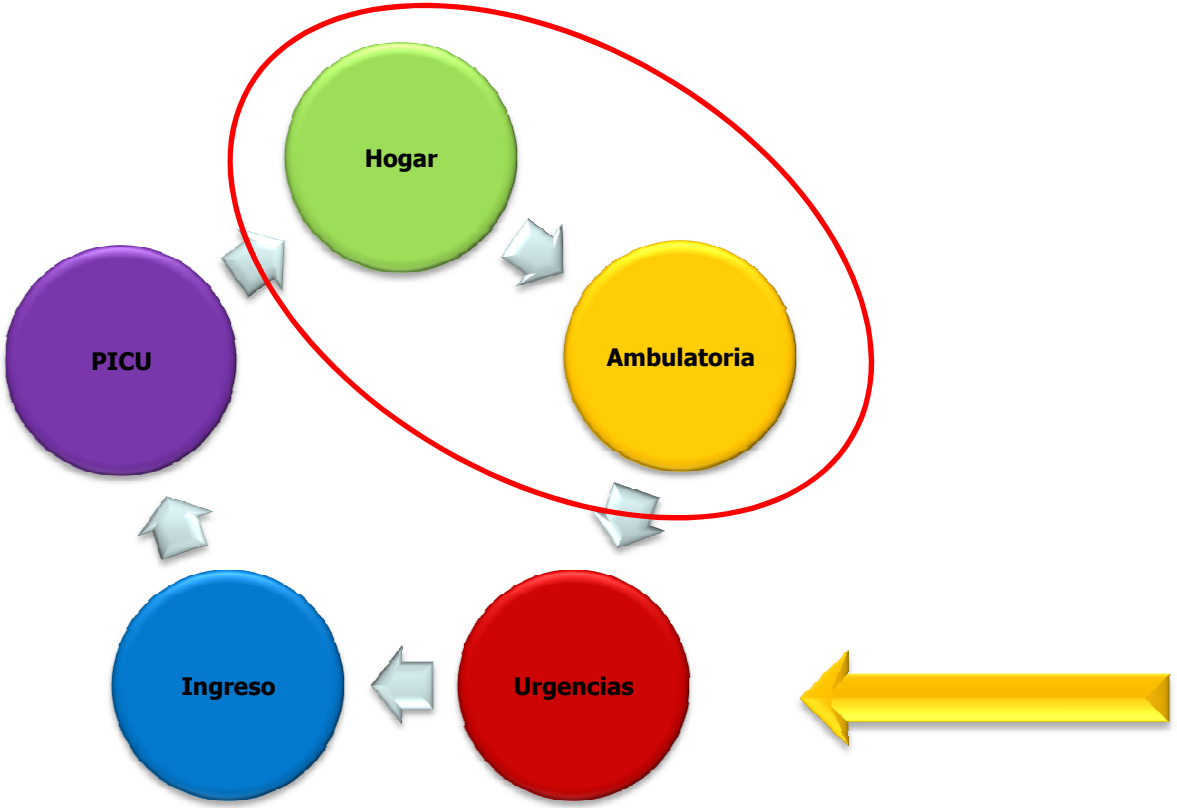
- Travers A – 2001
  - "… no hay evidencia suficiente para recomendar el uso de beta 2 – agonistas EF en asma severo" (…pero se necesitan mas trabajos…)
- Se debe considerar la Terbutalina EV en aquellos pacientes con poca respuesta a intervenciones iniciales agresivas

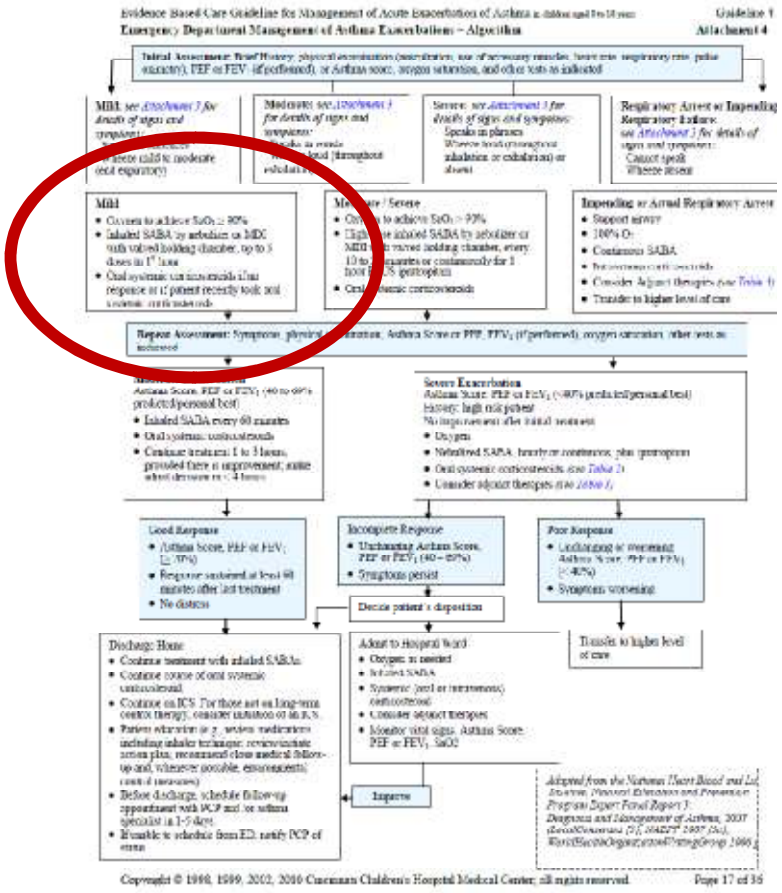
The Cochrane Library

Otras Modalidades…

- Heliox
- BiPAP – Bilevel Positive Airway Pressure
- Ventilación Mecánica

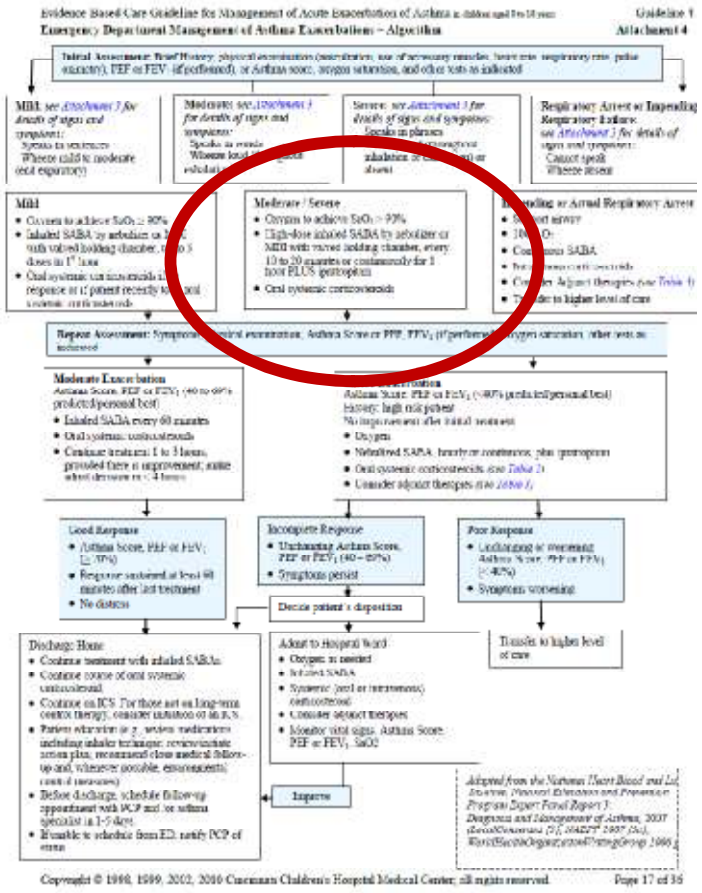
Asma en Pediatría





Leve...

- Oxigeno
- Albuterol Neb o MDI (3 dosis / hora)
- Considerar Prednisolona 1 mg/kg por 5 dias
- Observación
- Alta
  - Beta Agonistas
  - Corticoides
  - Considerar Terapia Control
- Educación



Moderada…

- Oxigeno
- Albuterol Neb o MDI (10 – 20 min)
- Ipratropium
- Prednisolona 1 mg/kg por 5 dias
- Observación
- Alta
  - Beta Agonistas
  - Corticoides
  - Terapia Control
- Educación

Ann Allergy Asthma Immunol. 2004 Jan;92(1):47-51.

Validity and responsiveness of a brief, asthma-specific quality-of-life instrument in children with acute asthma.

Gorelick MH[1], Brousseau DC, Stevens MW.

Author information

Abstract

OBJECTIVE: To test the validity and short-term responsiveness to change of a pediatric, asthma-specific, health-related quality-of-life (HRQL) instrument.

METHODS: Children 2 years and older treated in the emergency department (ED) for acute asthma were eligible for this prospective cohort study. A 10-item instrument, the Integrated Therapeutics Group Child Asthma Short Form (ITG-CASF), was administered at the time of the ED visit and again 14 days later (via telephone). At the follow-up call, parents were also asked about the child's current overall asthma status, missed school or limited activities, and persistence of asthma symptoms.

RESULTS: A total of 121 children were enrolled (mean age, 7.9 years), and follow-up was complete for 96 (79%). Mean +/- SD ITG-CASF scores at follow-up were significantly higher among children reported to have improved overall (61.8 +/- 19.6) than those not improved (41.9 +/- 21.2), and there was a significant correlation between ITG-CASF score at follow-up and the number of days of school missed or limited activities (r = -0.45; 95% confidence interval [CI], -0.24 to -0.66). There was also a significant difference in improvement in ITG-CASF score from ED visit to follow-up among those improved (13.7-point improvement) compared with those not improved (3.3-point improvement; difference = 10.4; 95% CI, 1.2 to 19.5). The effect size was 0.68, indicating a large responsiveness to change.

CONCLUSIONS: The ITG-CASF is a valid and responsive measure of HRQL in children with acute asthma and may be a useful outcome measure in evaluating ED treatment.

Cincinnati Children's

Asthma Action Plan for
Doctor's Name: Dr. Carol Roark Phone number: 859-655-6100

GO! (Green)	**Use these medicines EVERY DAY to prevent asthma attacks**		
You have ALL of these: • Breathing is good • No cough or wheeze • Sleeping through the night • Can work or play	**Medicine**	**How Much to Take**	**When to Take it**
	Flovent 44 mcg	**2 puffs**	**Morning and Night**
Before exercise, if needed:	2-4 puffs of Albuterol inhaler with spacer or 1 neb treatment, **30 minutes before** exercise		

CAUTION (Yellow)	**Keep taking daily medicines (above), and add**		
You have ANY of these: • Cough • Wheeze • Chest tight or shortness of breath • Waking at night due to cough or trouble breathing	**Medicine**	**How Much to Take**	**When to Take it**
	Albuterol	4 - 6 puffs of inhaler, or 1 nebulizer treatment	Every 4 hours as needed for 24-48 hours
	If you need Albuterol more often than every 4 hours, **OR** If you are having symptoms after 2 days, **OR** If the Albuterol is not helping at any time, ***CALL THE DOCTOR!***		

DANGER!! (Red)	**Take these medicines and call your doctor**		
Your asthma is getting worse quickly: • Albuterol is not helping within 15-20 minutes • Breathing is hard and fast • Ribs show • Lips or fingernails are blue • Trouble walking or talking	**Medicine**	**How Much to Take**	**When to Take it**
	Albuterol	4 - 6 puffs of inhaler, or 1 nebulizer treatment	Give Albuterol treatment every 5-10 minutes, up to 3 times in a row
	Get help from a doctor NOW! **If you cannot contact your doctor, go to the ER or call 911.** **Do NOT wait!**		

Check all items that trigger your asthma and things that could make your asthma worse.

x	Tobacco Smoke	x	Exercise, Sports, Work and Play		Dust Mites
	Molds		Cockroaches	x	Colds/Flu
	Change in Weather		Pets		Strong Odors and Sprays
	Unknown		Other Medicines		Allergies
	Foods		Other		

¿Preguntas?

Gracias

change the outcome®

Cincinnati Children's Hospital Medical Center