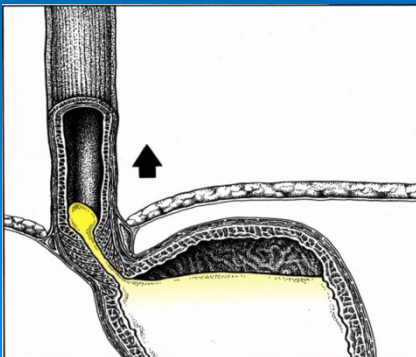
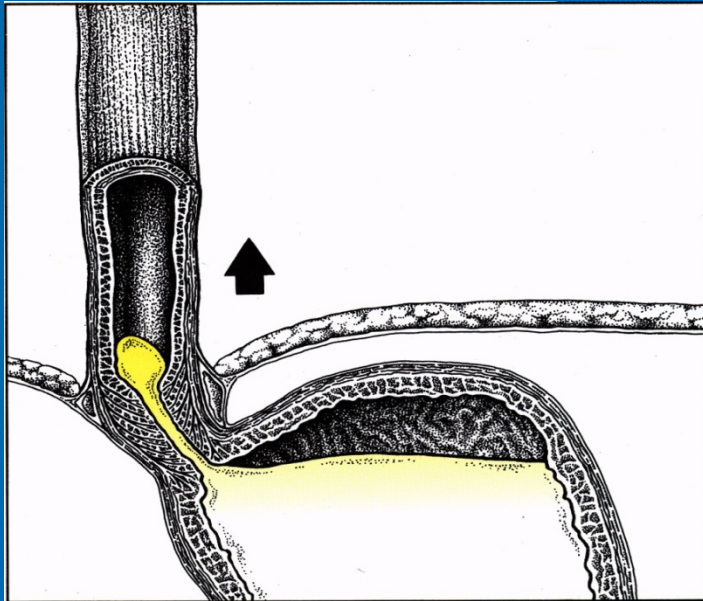


# Congreso de Pediatría Ambulatoria TREN PEDIATRICO

## ¿Que hay de nuevo en Reflujo Gastroesofágico? .



Dra. Marina Orsi.



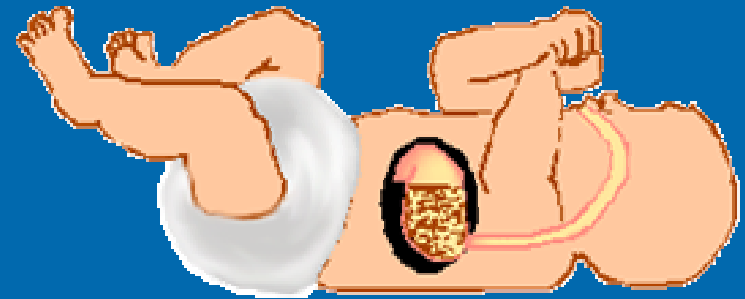
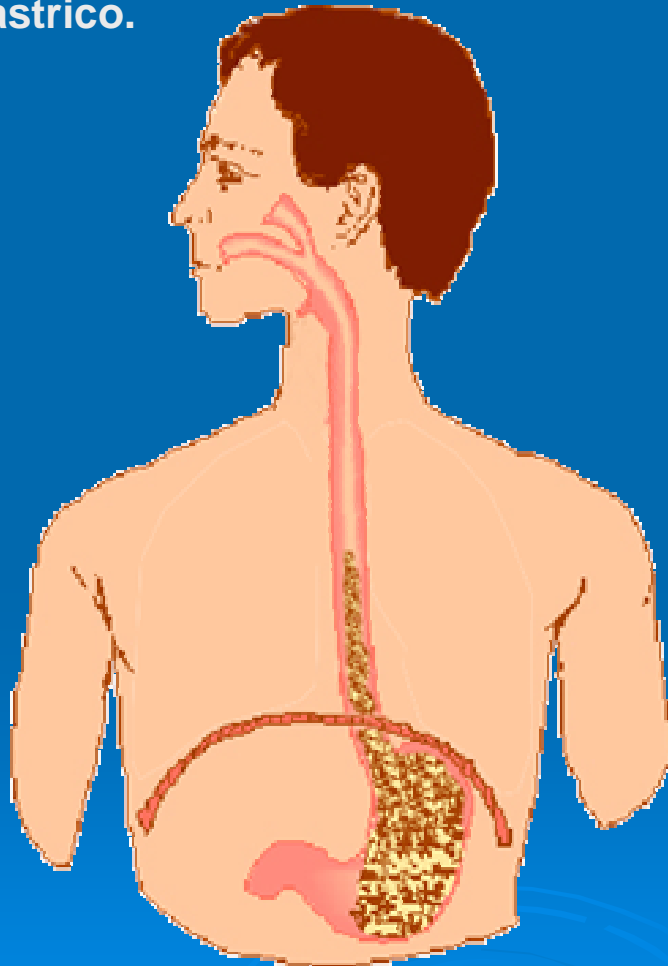
## RGE:

movimiento retrógrado  
del contenido gástrico  
hacia el esófago.

- **Fisiológico y normal**
- **Asintomático o regurgitación / vómito**
- **Se resuelve espontáneamente**
- **Postprandial**
- **Durante primeros 2 años de vida**

# Capacidad Gástrica

- La distensión gástrica sería un potente estímulo para la RT.
- Vaciamiento gástrico.



- Menor longitud
- Menor capacidad



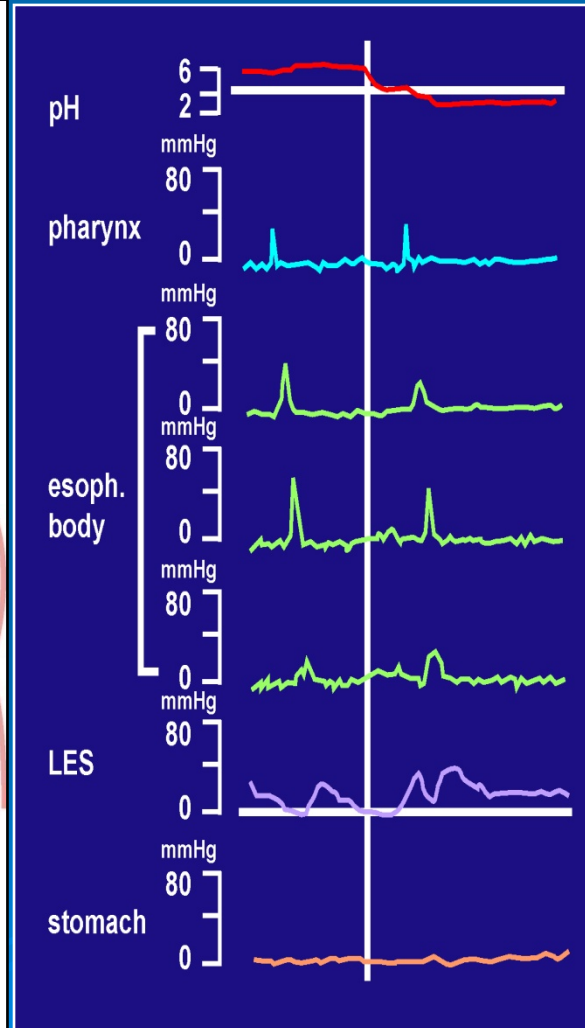
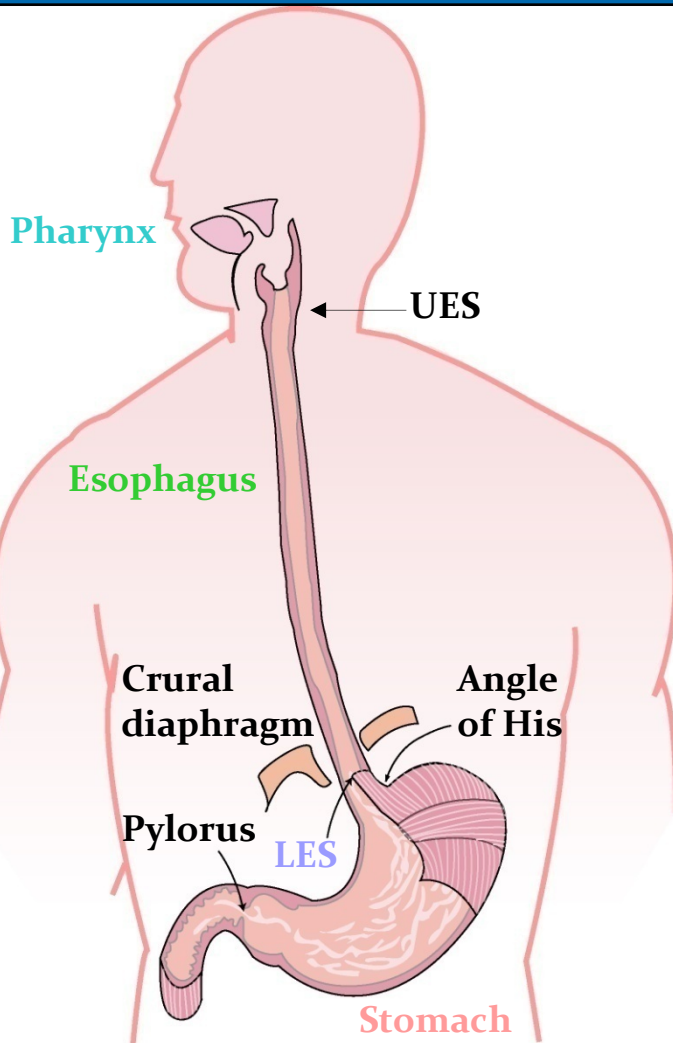
La extensión proximal se relaciona con la intensidad de los síntomas y con el movimiento

## Regurgitador o Vomitador “Feliz” :

Es el lactante que **regurgita y / o vomita** con variable intensidad , **sin otro síntoma acompañante**. Crece bien y está sonriente.

Tiene Reflujo Gastroesofágico **Fisiológico**.

# Relajaciones transitorias del EEI



Las RT del EEI son la causa + frecuente de RGE en niños y adultos.

**RT se define como disminución abrupta de la P del EEI, no relacionada a deglución o perístasis.**

RT ocurren en individuos sanos, pero en el RGE patológico su frecuencia y duración es mayor.

# Enfermedad por Reflujo Gastroesofágico.

Es el lactante o niño con síntomas digestivos y / o extradigestivos que se vinculan al **daño tisular producido por la intensidad o frecuencia de los episodios de reflujo.**

Se denomina :

Reflujo Gastroesofágico **Patológico.**



# SÍNTOMAS

- Vómitos.
- Regurgitaciones.
- Náuseas.
- Arcadas.
- Epigastralgia .
- Pirosis.
- Hematemesis.
- Melena.

# SÍNTOMAS .

- Anemia.
- Irritabilidad.
- Retardo ponderal.
- B.O.R. - Asma
- Neumonías reiteradas.
- Tos Recurrente.
- Estridor-Laringitis
- Dolor torácico.
- E .A .A .V.
- Sme de Sandifer.



# Posibles mecanismos involucrados en la enfermedad respiratoria relacionada al RGE

Obstrucción Luminal

Esófago

Arbol Traqueobronquial

Reflujo

Aspiración

Material aspirado

QUIMICA

Liberación de mediadores inflamatorios

Moco

Edema

NEURAL

Aferentes v. aérea

Eferentes de la v. aérea

Contracción Músculo liso Bronquial

Aferentes Esofágicos

# OBSTRUCCIÓN de la VIA AEREA

## Posibles mecanismos



**BRONQUIO:** Tres lugares potenciales de obstrucción de la vía aérea. La luz bronquial puede encontrarse disminuida por material de origen extra o intra-pulmonar. Por otro lado la lámina propia puede estar engrosada por edema y por último la contracción muscular puede estrechar la luz

# Diagnóstico Diferencial .

- Trastornos metabólicos.
- Síndrome Pilórico.
- Alergia a la proteína de la leche de vaca.
- **Infecciones** (gastroenteritis-inf.urinaria )
- Hipertensión endocraneana.
- Trastornos hidroelectrolíticos.
- Gastritis -Duodenitis.
- Enf.úlcero péptica.

# DIAGNÓSTICO

## HISTORIA CLÍNICA

- **Edad** al comienzo del cuadro clínico.
- **Síntomas al inicio** y en el **tiempo**.
- **Evolución según tipo de alimentación.**
- Curva de crecimiento ( Peso – Talla )
- Asociación con **síntomas ORL** o con
- Síntomas **respiratorios** o con
- Síntomas **neurológicos**

# DIAGNÓSTICO

- **Seriada Gastroduodenal bajo radioscopia.**
- **Video-Deglución con S.G.D.**
- **Endoscopia alta con biopsias.**
- **pHmetría de 24 horas.**
- **Manometría Esofágica.**
- **Gamma - cámara.**
- **Impedanciometría Intraluminal Multicanal con phmetria / manometria de 24 hs.**

**Hernia Hiatal  
con RGE** →



# Aspiración

20-Jun-03 14:55

M1:511  
M2:256  
E:127



7

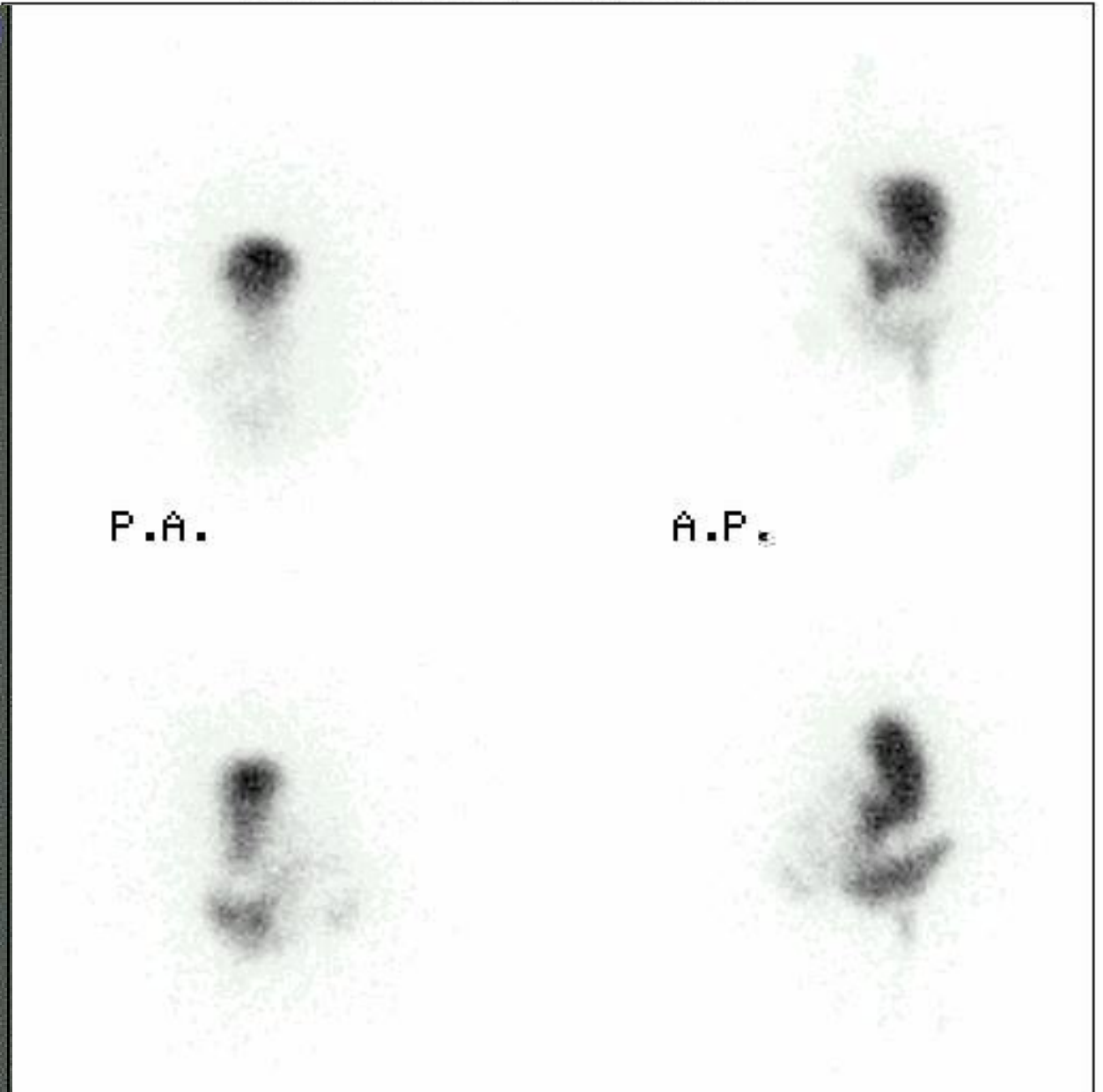
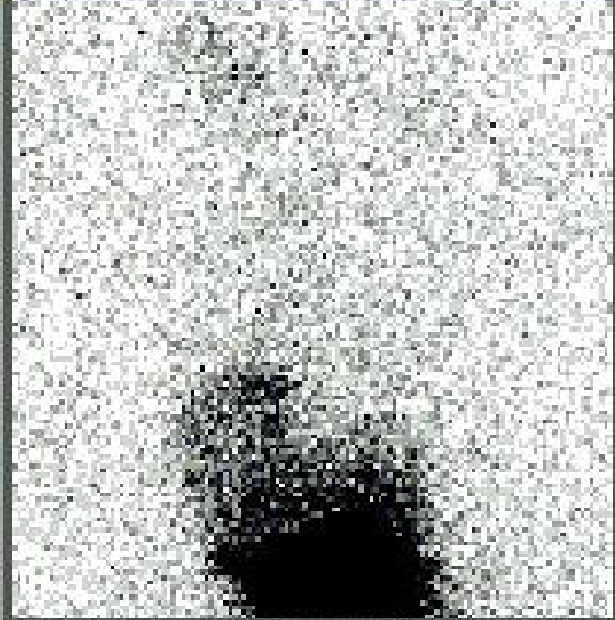
Medi

PERFIL  
HOSPITAL ITALIANO

10/09/01

VACIAMIENTO GASTRICO

DELFINO\_570\_M.A.P.



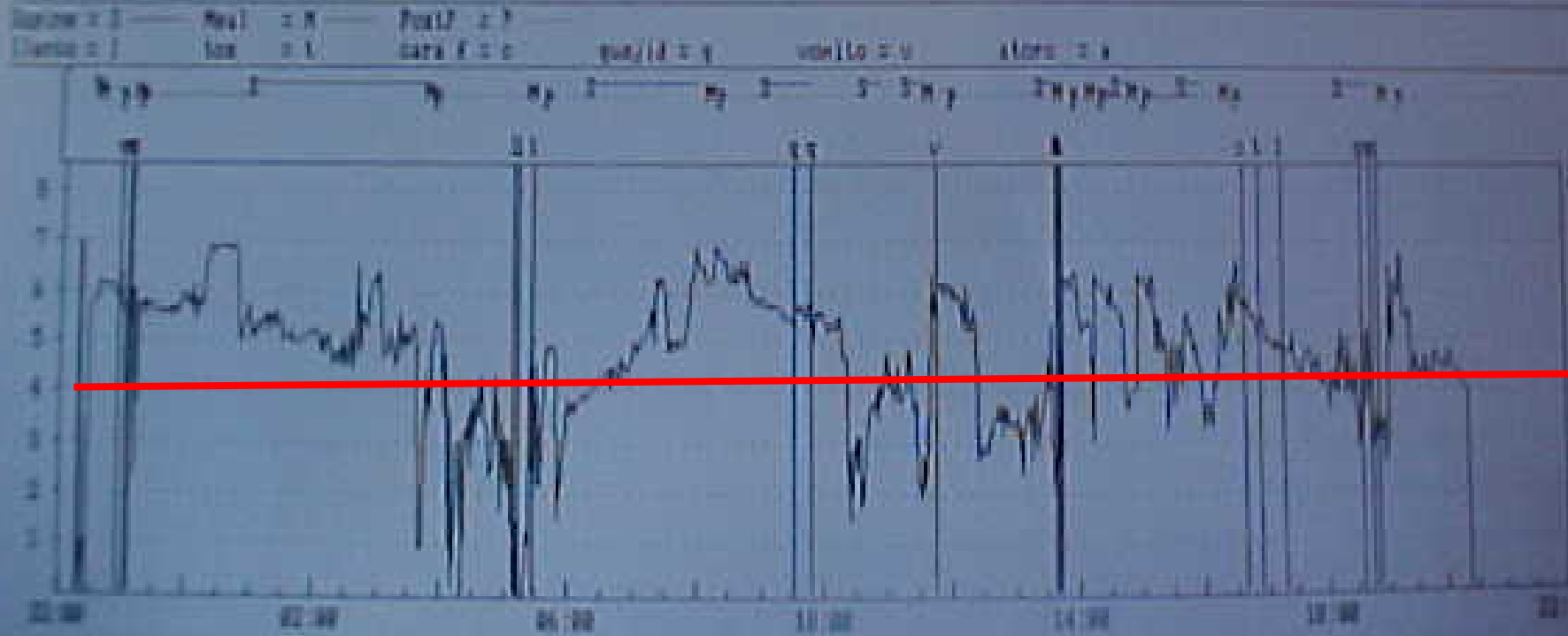




# pH-metría patológica

		04:30	05:30	07:42	09:42	11:38	13:38
Temperatura	(°C)	34.34	33.18	33.42	33.42	33.18	33.38
Number of yellow plaques	(#)	00	11	10	10	01	10
Number of yellow plaques							
Number of yellow plaques	(#)	1	2	1	1	2	0
Number yellow plaques	(#)	11	8	8	8	8	8
Total time pH below 4.00	(min)	00	22	20	20	22	8
Fastest time pH below 4.00	(s)	17.8	41.3	8.9	8.9	41.3	28.8

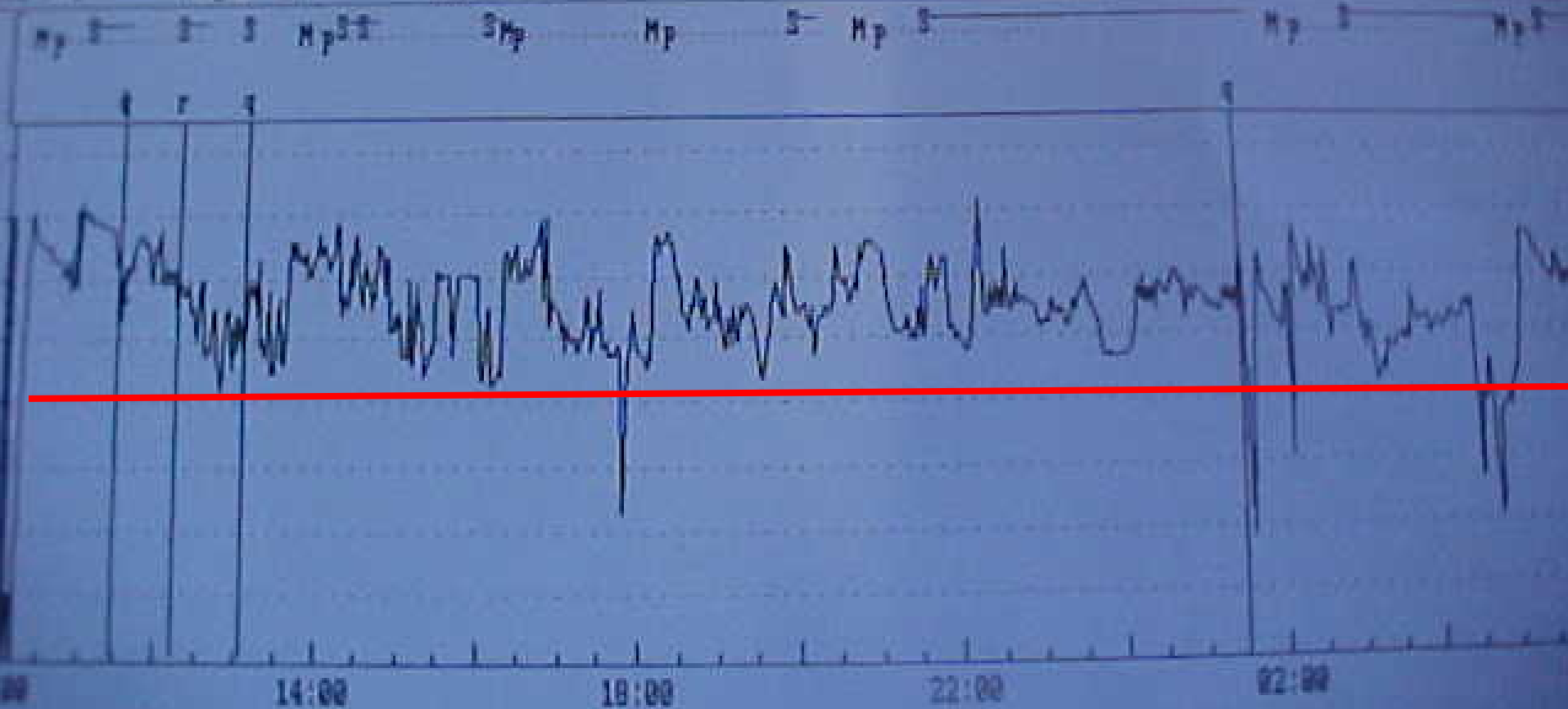
Output 1 (pH) (pH)



# pH-metría normal

Meal 1 = pH ( pH )

Meal = M      PostLP = P  
regur = r      quaji = q



# Correlación sintomática apnea - rge

Apnea L

ca 1 : 5.15

Supino

Conida

PostP

A = AHOGO

L = LLANTO

T = TOS

v = vomito

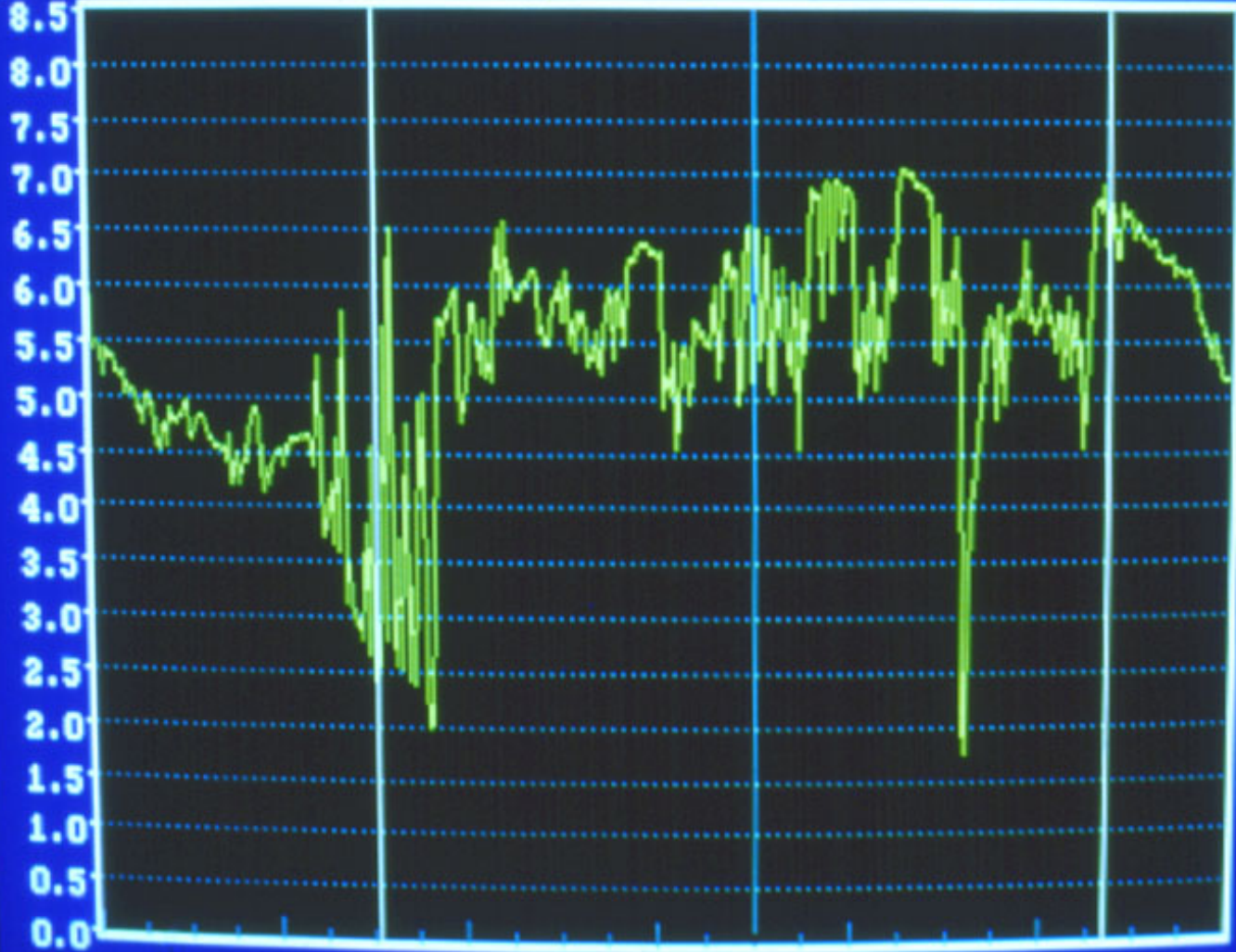
↑ ↓ = Intervalo  
12 horas

← → = Hora  
03:00

Presione ?  
Para ayuda

pH

Canal 1 : pH



20:00

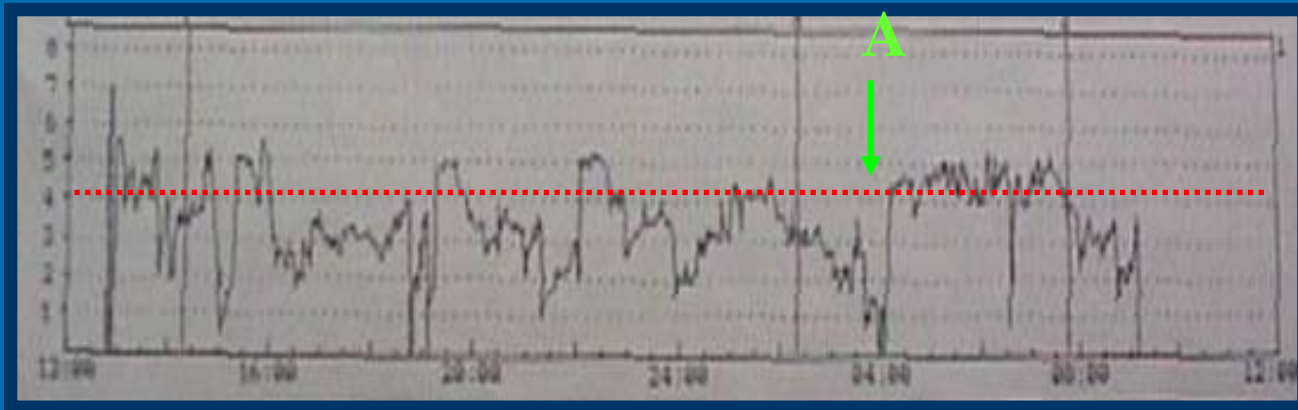
24:00

04:00

08:00

# pHmetría en un paciente con EAAV

1<sup>a</sup>  
pH



IR:28,2%

2<sup>a</sup>  
pH



IR:6,9%

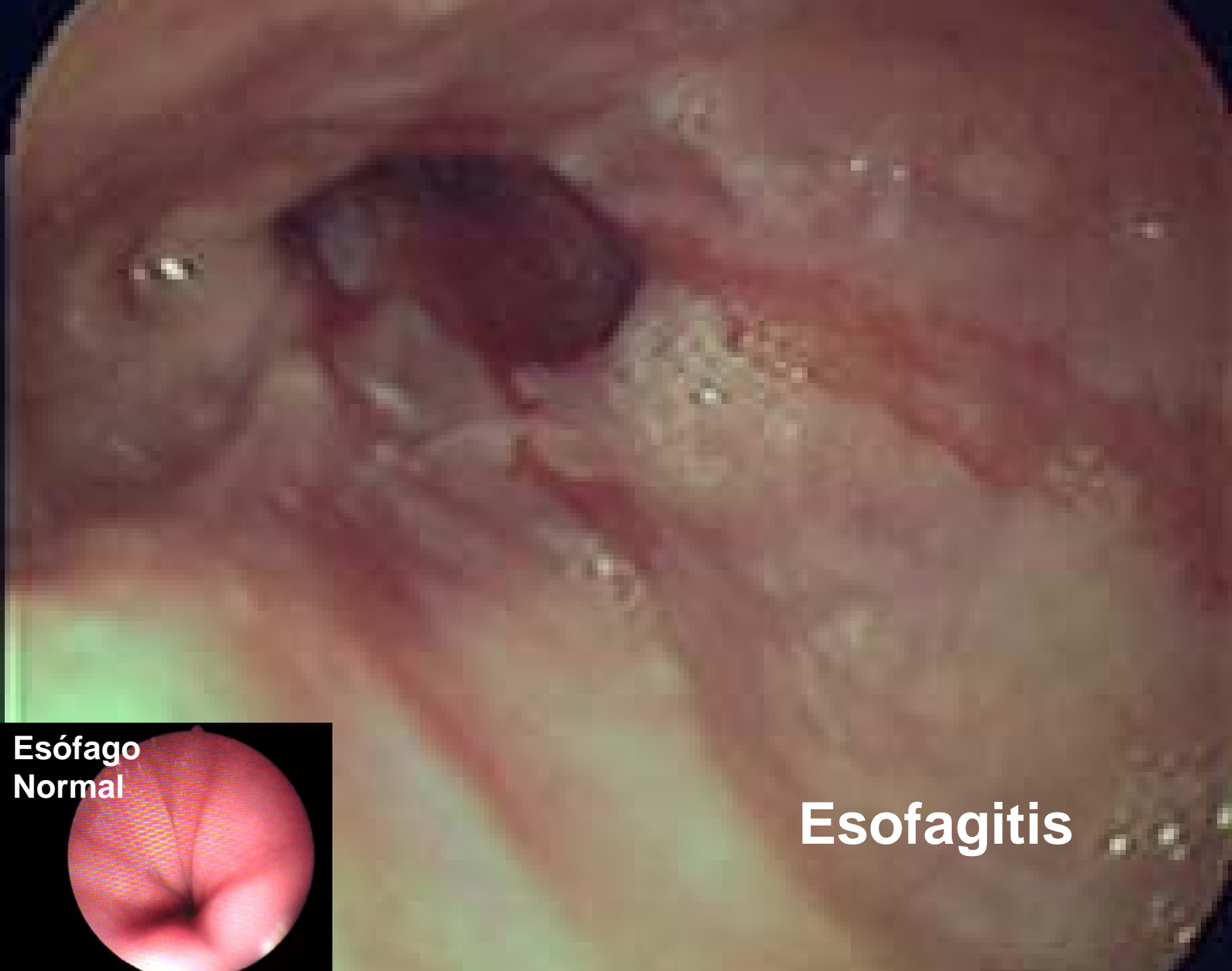
3<sup>a</sup>  
pH



IR:1.8%

# Rol de la endoscopía en el RGE patológico

- Para evaluar la presencia o no del daño mucoso y la severidad del mismo.
- Cuando los síntomas son importantes y la pHmetría es normal.
- Cuando la clínica parece sugerir otros diagnósticos ej : esofagitis eosinofílica ; gastritis por Helicobacter Pylori .
- Cuando los síntomas no ceden con el tratamiento.
- En el seguimiento del RGE patológico persistente.
- Previo a la cirugía del RGE.
- Cuando se decide dar de alta al paciente.

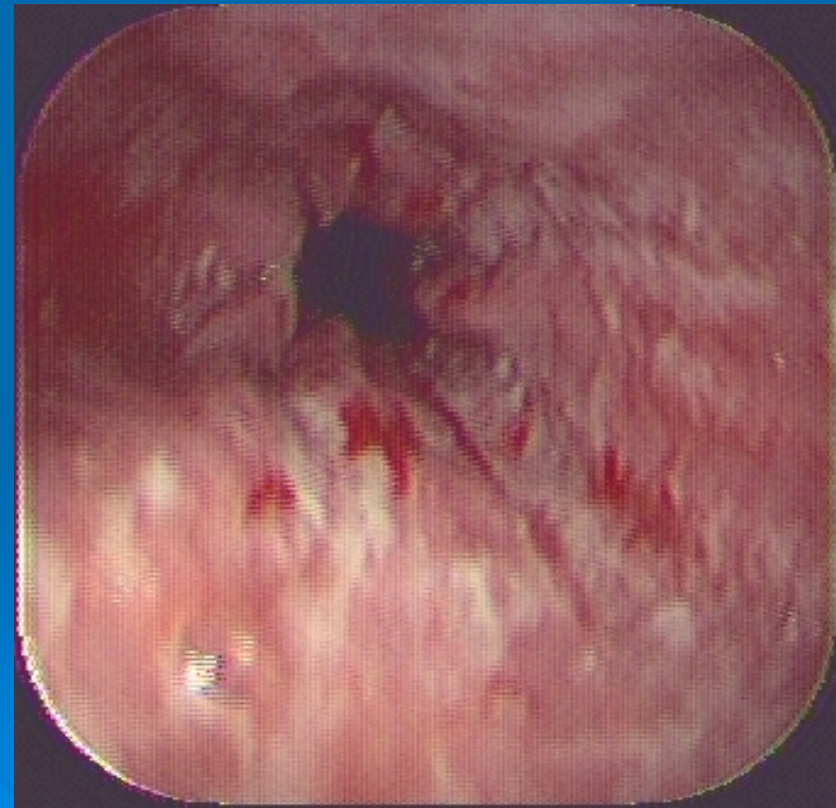
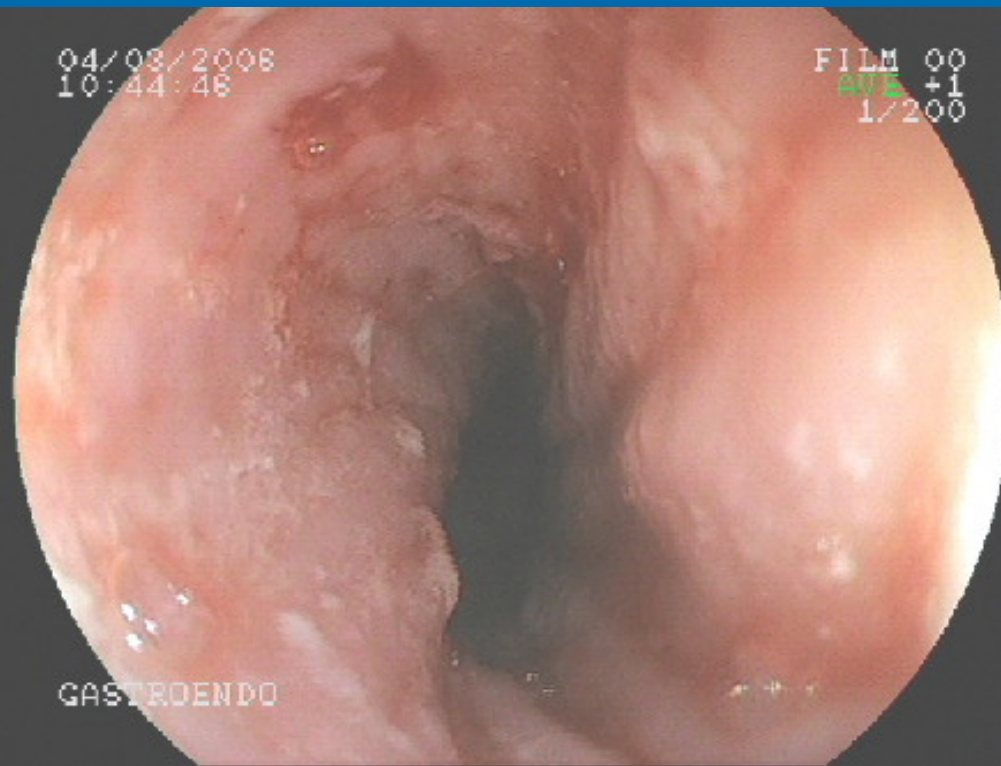


**Esofagitis**

**Esófago  
Normal**



# Esofagitis Eosinofílica



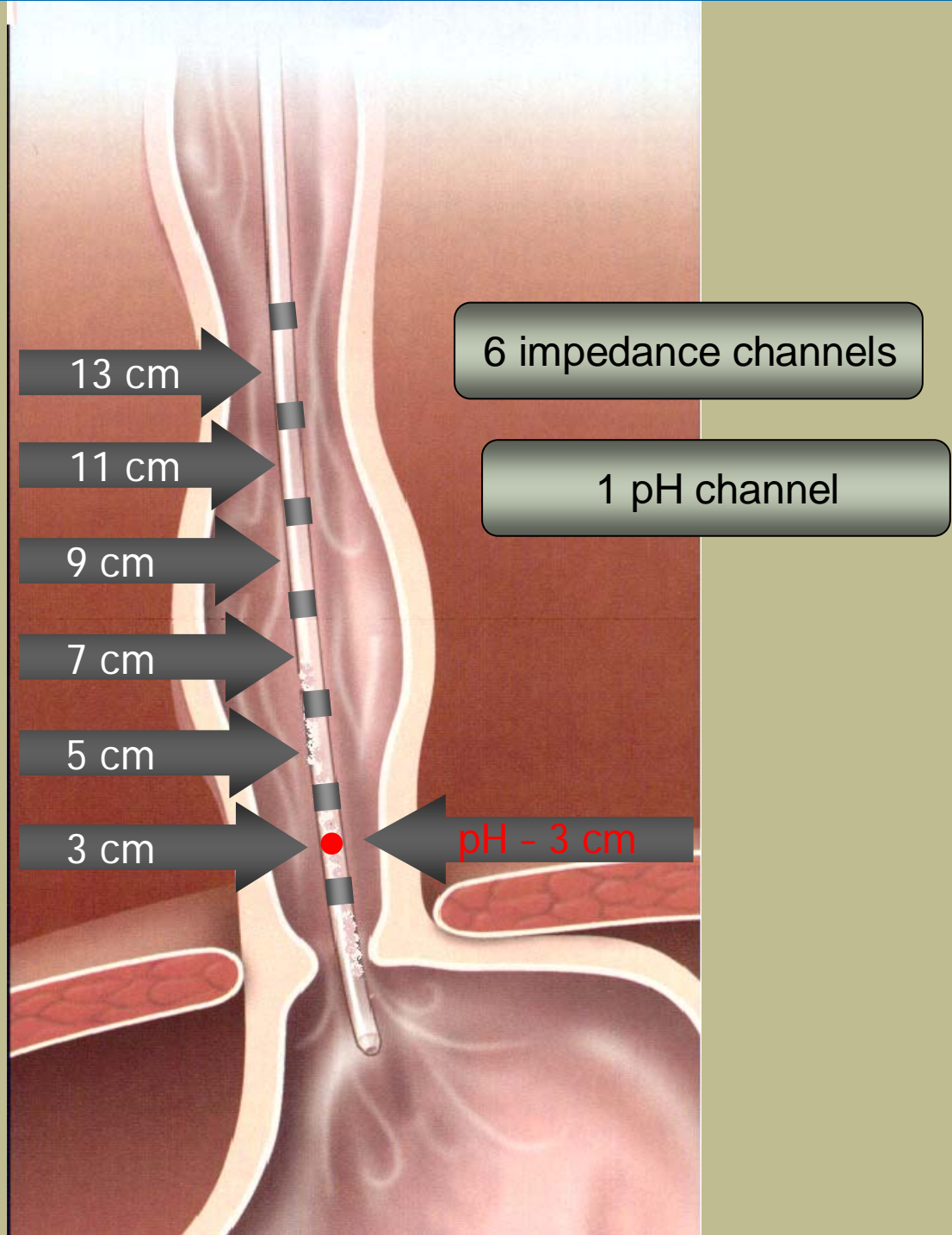


# Impedanciometría Intraluminal Multicanal con phmetría de 24 hs.

- Detecta RGE ácido y **no ácido** .
- Puede **establecer diagnóstico** en pacientes con **síntomas refractarios** durante el tratamiento médico.
- Permite **evaluarlos con o sin medicación**.
- **Correlaciona síntomas** con episodios ácidos o no ácidos.
- **Cuantifica el patrón de reflujo y la correlación sintomática** también en el período post-prandial.
- Es capaz de **diagnosticar el reflujo supra-esofágico**.
- Puede **monitorear a los lactantes pequeños con alimentación muy frecuente**

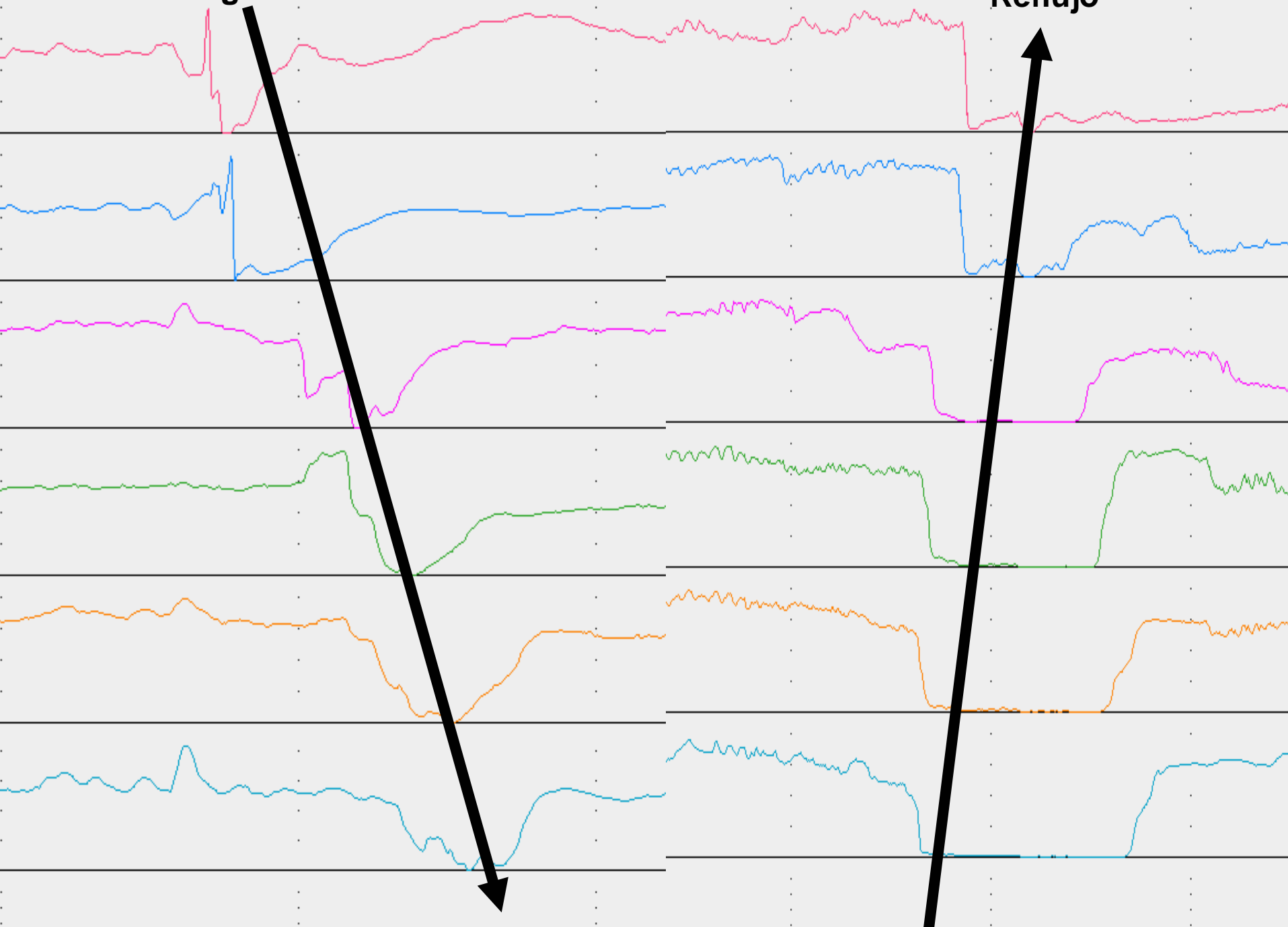
# Impedance -pH Catheter

Pediatric Model



**Deglución**

**Reflujo**



Drug	
Meal	
Pain	
Recumbent	
Regurgitate	

**Reflujo No Acido**

- 1: Z Body ohms
- 2: Z Body ohms
- 3: Z Body ohms
- 4: Z Body ohms
- 5: Z Body ohms
- 6: Z Body ohms
- 7: pH Body pH



**MI Reflux - A \***

1	BCT	Body	0.3
2	BCT	Body	0.4
3	BCT	Body	7.5
4	BCT	Body	8.8
5	BCT	Body	11.0
6	BCT	Body	10.7
7	pH Delta	Body	1.44

Position MII pH  Upright Reflux

# Pediatric Gastroesophageal Reflux Clinical Practice Guidelines:

Joint Recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN)

**Co-Chairs:** Yvan Vandenplas and yColin D. Rudolph

**Committee Members:** zCarlo Di Lorenzo, §Eric Hassall, jjGregory Liptak, Lynnette Mazur, #Judith Sondheimer, Annamaria Staiano, yyMichael Thomson, zzGigi Veereman-Wauters, and §§Tobias G. Wenzl

UZ Brussel Kinderen, Brussels, Belgium, {Division of Pediatric Gastroenterology, Hepatology, and Nutrition, Children's Hospital of Wisconsin, Medical College of Wisconsin, Milwaukee, WI, USA, {Division of Pediatric Gastroenterology, Nationwide Children's Hospital, The Ohio State University, Columbus, OH, USA, §Division of Gastroenterology, Department of Pediatrics, British Columbia Children's Hospital/University of British Columbia, Vancouver, BC, Canada, jj Department of Pediatrics, Upstate Medical University, Syracuse, NY, USA, Department of Pediatrics, University of Texas Health Sciences Center Houston and Shriners Hospital for Children, Houston, TX, USA, #Department of Pediatrics, University of Colorado Health Sciences Center, Denver, CO, USA, Department of Pediatrics, University of Naples "Federico II," Naples, Italy, {{Centre for Paediatric Gastroenterology, Sheffield Children's Hospital, Western Bank, Sheffield, UK, {{Pediatric Gastroenterology & Nutrition, Queen Paola Children's Hospital, Antwerp, Belgium, and §§Klinik für Kinder- und Jugendmedizin, Universitätsklinikum der RWTH Aachen, Aachen, Germany

**Journal of Pediatric Gastroenterology and Nutrition 49:498–547 # 2009**

# pHmetría de 24 horas ( Guidelines 2009 )

This test is a valid quantitative measure of esophageal acid exposure with established normal ranges.

In pH studies performed with antimony electrodes, an RI > 7% is considered abnormal, an RI < 3% is considered normal , and an RI between 3% and 7% is indeterminate.

However, the severity of pathologic acid reflux does not correlate consistently with symptom severity or demonstrable complications.

Esophageal pH monitoring is useful for evaluating the efficacy of antisecretory therapy. It may be useful to correlate symptoms (eg, cough, chest pain) with acid reflux episodes and to select those infants and children with wheezing or respiratory symptoms in whom GER is an aggravating factor.

The sensitivity, specificity, and clinical utility of pH monitoring for diagnosis and management of possible extraesophageal complications of GER are not well established

# Impedanciometría Intraluminal Multicanal – pHmetría de 24 hs

This test detects acid, weakly acid , and nonacid reflux episodes.

It is superior to pH monitoring alone for evaluation of the temporal relation between symptoms and GER.

The technology is especially useful in the postprandial period or at other times when gastric contents are nonacidic. The relation between weakly acid reflux and symptoms of GERD requires clarification.

Measurement of other parameters such as SI or SAP may be of additional value to prove symptom association with reflux, especially when combined with MII .

Whether combined esophageal pH and impedance monitoring will provide useful measurements that vary directly with disease severity, prognosis, and response to therapy in pediatric patients has yet to be determined.

# Tratamiento de Prueba con IBP

An uncontrolled trial of esomeprazole therapy in adolescents with heartburn, epigastric pain, and acid regurgitation showed complete resolution of symptoms in 30% to 43% by 1 week, but the responders increased to 65% following 8 weeks of treatment.

Another uncontrolled treatment trial of pantoprazole in children ages 5 to 11 years reported greater symptom improvement at 1 week with one 40-mg dose compared with one 10-mg or 20-mg dose (64). After 8 weeks all of the treatment groups improved. Similar improvement in symptoms over time has been observed in adults with erosive esophagitis (198,199).

One study of infants with symptoms suggestive of GERD who were treated empirically with a PPI showed no efficacy over placebo.

The 2-week “PPI test” lacks adequate specificity and sensitivity for use in clinical practice.

In an older child or adolescent with symptoms suggesting GERD, an empiric PPI trial is justified for up to 4 weeks.

Improvement following treatment does not confirm a diagnosis of GERD because symptoms may improve spontaneously or respond by a placebo effect.

There is No evidence to support an empiric trial of pharmacologic treatment in infants and young children as a diagnostic test of GERD.



# Uso de Inhibidores de Bomba de protones en niños

Journal of Pediatric Gastroenterology and Nutrition

49:498–547 # 2009 by European Society for Pediatric Gastroenterology, Hepatology, and Nutrition and North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition

- PPIs currently approved for use in children in
- North America are **omeprazole, lansoprazole, and esomeprazole.**
- At this moment, in Europe, only **omeprazole and esomeprazole** are approved.
- No PPI has been approved for use in infants younger than 1 year of age.
- Most studies of PPIs in children are open-label and uncontrolled.
- In children, as in adults, PPIs are highly efficacious for the treatment of symptoms due to GERD and the healing of erosive disease.
- PPIs have greater efficacy than H2RAs.
- Children 1 to 10 years of age appear to require a higher dose per kilogram for some PPIs than adolescents and adults.
- Young children require higher per kilogram doses to attain the same acid blocking effect or area under the curve (304–306). This may **not apply to all of the PPIs(307).**
- There are few pharmacokinetic data for PPIs in infants, but studies indicate that infants younger than 6 months may have a lower per-kilogram dose requirement than older children and adolescents (308,309).

# Uso de Inhibidores de Bomba de protones en niños

Journal of Pediatric Gastroenterology and Nutrition

49:498–547 # 2009 by European Society for Pediatric Gastroenterology, Hepatology, and Nutrition and North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition

PPIs inhibit acid secretion by blocking  $\text{Na}^+/\text{K}^+$ -ATPase, the final common pathway of parietal cell acid secretion, often called the proton pump.

Studies in adults have shown that **PPIs produce higher and faster healing rates for erosive esophagitis than H2RAs**, which in turn are better than placebo (122).

The superior efficacy of PPIs is largely because of their ability to maintain intragastric pH at or above 4 for longer periods and to inhibit meal-induced acid secretion, a characteristic not shared by H2RAs. In contrast with H2RAs, the effect of PPIs does not diminish with chronic use.

The potent suppression of acid secretion by PPIs also results in decrease of 24-hour intragastric volumes, thereby facilitating gastric emptying and decreasing volume reflux.

- Despite their efficacy in the management of acid related disorders, PPIs have limitations as a consequence of their pharmacologic characteristics.
- They must be taken once per day before breakfast and must be protected from gastric acid by enteric coatings. Bioavailability of PPIs is decreased if they are not taken before meals.
- However, taking the medications before meals effectively delays absorption and onset of their antisecretory effect. Most available PPIs are therefore regarded as “delayed release” preparations.
- Achievement of maximal acid suppressant effect can take up to 4 days.

## Objetivo en el manejo de la ERGE en niños según las Guías NASPGHAN\*

*“mejorar o resolver los síntomas presentes y las complicaciones del reflujo gastroesofágico, con intervenciones que tengan pocos o ningún efecto adverso y con reanudación funcional.”*

\* North American Society for Pediatric Gastroenterology, Hepatology and Nutrition

Rudolph CD et al. J Pediatr Gastroenterol Nutr 2001;32 Suppl 2:S1–31

# TRATAMIENTO

## Lactante Vomitador.

- Espesamiento de la alimentación: casera o en base a fórmulas “AR”.
- Cuidar el volumen en cada toma.
- Posición prona postprandial a 30°.

**Si no responde a éstos cambios ( 2 a 3 semanas ) es posible intentar una serie de tratamiento y valorar la respuesta al mismo.**

# El iceberg del RGE

Alternativas  
Terapéuticas

Tratamiento  
quirúrgico



La mayoría de los lactantes y niños mejoran con cambio de hábitos y dieta. Los más afectados requieren medicación y algunos pocos deberían ser intervenidos quirúrgicamente

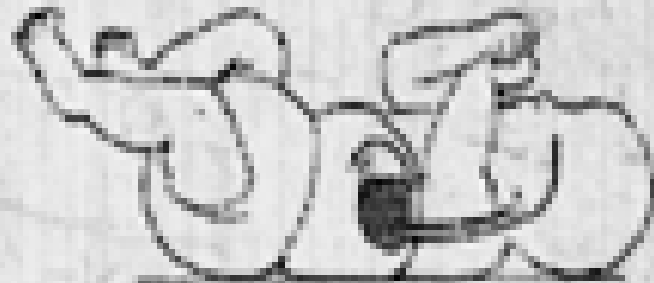
# Posición para lactantes con RGE



Sitting



Prone



Supine



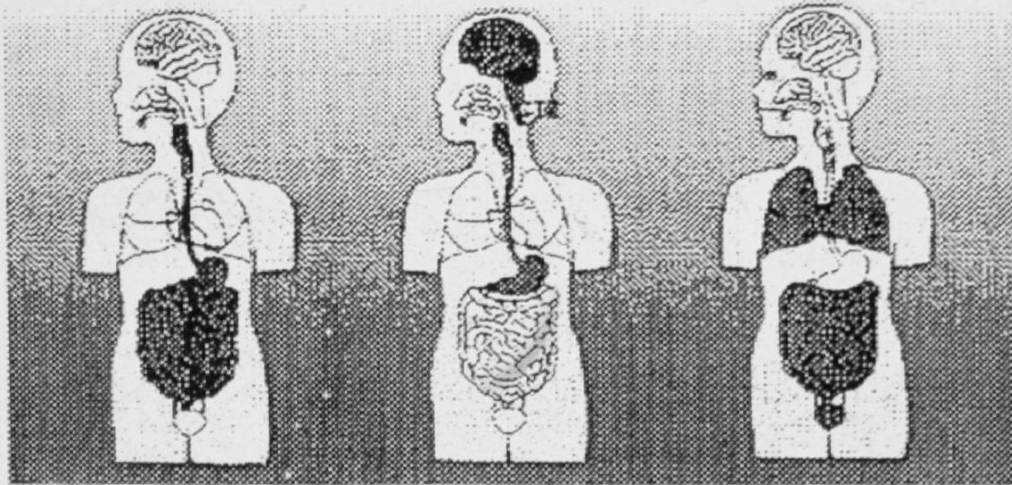
# Tratamiento Médico.

- **Proquinéticos** :
- **Metoclopramida**: pasa la barrera hematoencefálica, la dosis terapéutica y la dosis tóxica son muy cercanas ,lo que facilita las intoxicaciones.
- **Cisapride** : 0.1mg-0.2mg / kg /dosis cada 6 hs. a 8 hs , con una dosis máxima de 0.8mg/ kg / día. Por el riesgo de prolongación del QT- QTc se recomienda realizar ECG previo y suspenderlo ante asociaciones medicamentosas o metabólicas de riesgo.
- **Domperidona** :0,3 mg / kg / día en 3 dosis diarias. Mismo efecto sobre el QT-QTc y no está aceptado por FDA y existen pocos estudios en Pediatría.



# Mecanismos y sitio de acción de los proquinéticos

## Mechanisms and Sites of Action of Prokinetic Agents



Cisapride

Serotonergic Agonist

Metoclopramide

Dopamine  
Antagonist

Bethanechol

Cholinergic Agonist

## Las guías NASPGHAN reconocen a los IBP como el tratamiento más efectivo en niños con ERGE

*“los IBP, son la terapia medicamentosa supresora del ácido más efectiva,*

*superior a H<sub>2</sub>RAs en el rescate de los síntomas y en la curación de la esofagitis<sup>†</sup>”*

<sup>†</sup>No todos los IBP están actualmente aprobados para ser usados en Pediatría

Rudolph CD et al. J Pediatr Gastroenterol Nutr 2001;32 Suppl 2:S1–31

# Tratamiento Médico.

**ANTIÁCIDOS:** El objetivo es disminuir el pH gástrico y así cambiar la calidad del material refluido, mejorar el clearance y favorecer el aumento de la Presión del EEI.

- Ranitidina: (jarabe) :5 - 10 mg / kg / día oral cada 12 hs.
- Omeprazol : (polvo p/diluir):0,7 - 2,4 mg/ kg/día c / 12 hs.
- Esomeprazol:(polvo para diluir): 0,6 - 2mg/kg/d 1 a 2 t /d
- Lanzoprazol :(granulado p/ diluir) :0,5 - 1,5mg /kg/ d 1 t/d

# Tratamiento Quirúrgico

RGE que **no responde a tratamiento médico** .

Riesgo de **complicaciones severas** ej : Estenosis péptica -  
Esófago de Barrett.

Episodios con **riesgo de vida** para el paciente.

Persistencia de **esofagitis severa a pesar del tratamiento médico**.

En niños con daño neurológico al que se le realice una  
gastrostomía y presente RGE persistente.

# Cirugía Antireflujo.

- Operación de Nissen.
- Operación de Thal.
- Operación de Boix Ochoa.

Hoy en día se puede realizar en forma **convencional** o por **vía laparoscópica** inclusive ya existe una serie pediátrica publicada con técnica endoscópica.

Para establecer cual es el abordaje mas conveniente en cada caso, todavía falta tiempo , que permita comparar las diferentes series.

Las ventajas de cada técnica depende entre otras cosas del entrenamiento del equipo quirúrgico



*Gracias, por su atención.*



***Gracias por su atención .***

# Indicaciones del uso en RGE

With regard to maintenance therapy, in a prospective study of children whose **erosive esophagitis had healed following 3 months of omeprazole therapy, only half maintained the remission of symptoms and endoscopic disease in a maintenance phase during which they received half the healing dose of PPI (316).**

In another study, patients whose erosive esophagitis **healed after 3 months' omeprazole treatment (1.4 mg/kg/day) underwent double-blind randomization into 3 groups, receiving either maintenance therapy with omeprazole at half the healing dose, ranitidine, or placebo for 6 months (130).**

In all 3 groups, **few patients had a relapse of symptoms or of endoscopic esophagitis during or after maintenance therapy.**

There were important differences between these 2 studies. Specifically, in the first study, the mean grade of esophagitis was higher, and 41% of patients had an underlying disorder predisposing to GERD

- In a retrospective study of 166 children with erosive esophagitis unable to withdraw from PPIs for up to 11 years (median 3.5 years), 79% had at least 1 underlying condition predisposing them to GERD and 39% had HH (28).
- Thus, **patients with lower grades of erosive esophagitis and without an underlying high-risk condition may not require long-term PPI therapy after initial effective treatment.**
- 
- In a recent study of adults with long-term PPI use, 27% were able to discontinue drug without relapse (452).



# Indicaciones del uso en RGE:

- PPIs are recommended as initial therapy in children with **erosive esophagitis**.
- **Initial treatment for 3 months is advised.**
- **If adequate control of symptoms is not achieved within 4 weeks, the dose of PPI can be increased.**
- Patients who require **higher PPI dose** to control symptoms and produce healing are those with conditions that predispose to **severe-chronic GERD and those with higher grades of esophagitis or BE**.
  - In most cases, efficacy of therapy can be **monitored by extent of symptom relief** without routine endoscopic follow-up.
- **Endoscopic monitoring of treatment efficacy may be useful in patients whose presenting signs and symptoms are atypical, who have persistent symptoms while taking adequate acid-suppressive drugs, or who had higher grades of esophagitis or esophageal stricture at presentation (see also Section 5.2.2)**
- **Follow up endoscopy is not routinely indicated in patients with nonerosive disease, particularly if they are asymptomatic on medication.**
- **Most patients require only 1 daily dose of PPI to obtain symptomatic relief and heal esophagitis (29,131,447,459).**
- The optimum dosage regimen is to administer a once-daily dose 15 to 30 minutes before the first meal of the day.
- **It is not necessary to make patients achlorhydric to relieve symptoms or heal esophagitis, and, in light of the data on infectious and other complications of acid suppression by H2RAs or PPIs, it is probably not desirable to do so.**