



# Investigation et prise en charge des troubles digestifs fonctionnels hauts

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23.02.2023

	Definition	Prevalence* <sup>3</sup>	Confirmatory tests required† <sup>16-21</sup>
Functional dysphagia	A sensation of abnormal food bolus transit through the oesophagus in the absence of structural, motor, or mucosal abnormalities	3.2%	Endoscopy and biopsies, barium swallow, and high-resolution oesophageal manometry
Functional heartburn	Retrosternal burning, discomfort, or pain, which is refractory to optimal acid suppression therapy, in the absence of gastro-oesophageal reflux, histopathological mucosal abnormalities, major motor disorders, or structural abnormalities	1.1%	Endoscopy and biopsies, and 24 h pH and impedance studies
Functional chest pain	Recurrent, unexplained, retrosternal chest pain of presumed oesophageal origin, which is different from heartburn, and not explained by reflux disease, mucosal abnormalities, or motor abnormalities	1.4%	Cardiology assessment, endoscopy and biopsies, and 24 h pH and impedance studies
Functional dyspepsia	Characterised by one or more symptoms, including postprandial fullness, early satiety, epigastric pain, or epigastric burning, which are unexplained after routine clinical investigation	7.2%	Endoscopy and biopsies if alarm symptoms are present



# Outline

- Gastro-esophageal reflux Disease (GERD)
- Functional heartburn
- Reflux hypersensitivity

**Ambulatory reflux monitoring**

- Dysphagia
  - Functional dysphagia
  - Esophageal Motor disorders

**High Resolution esophageal Manometry (HRM)  
Endo-FLIP**

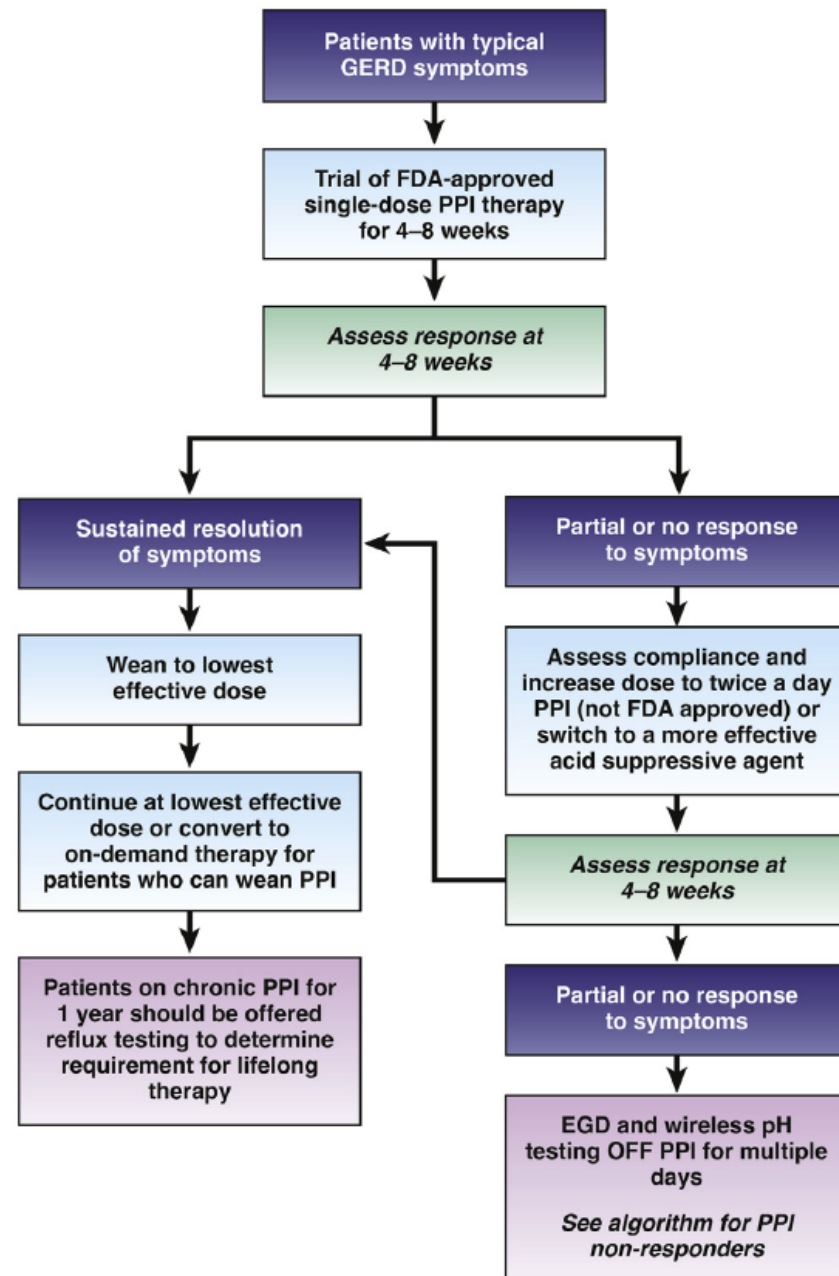


# Gastro-esophageal reflux Disease (GERD)

- Symptoms of GERD encompass
  - Typical esophageal symptoms: heartburn or regurgitation
  - Atypical esophageal symptom: Noncardiac chest pain and a myriad of extra-esophageal symptoms which include cough, dysphonia, sore throat, and globus

N.B: pharyngo-laryngeal erythema has no specificity in diagnosing GERD

- Yadlapati et al on behalf of the CGIT GERD Consensus Conference Participants, AGA Clinical Practice Update on the Personalized Approach to the Evaluation and Management of GERD: Expert Review. *Clinical Gastroenterology and Hepatology* 2022;20:984–994
- Zerbib et al, Diagnostic actuel du RGO : Consensus de Lyon (GUT 2018). [POST'U 2020](#)



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- Isolated extra-esophageal symptoms and suspicion for reflux etiology:
  - Clinicians should perform upfront objective reflux testing off medication (rather than an empiric PPI trial)

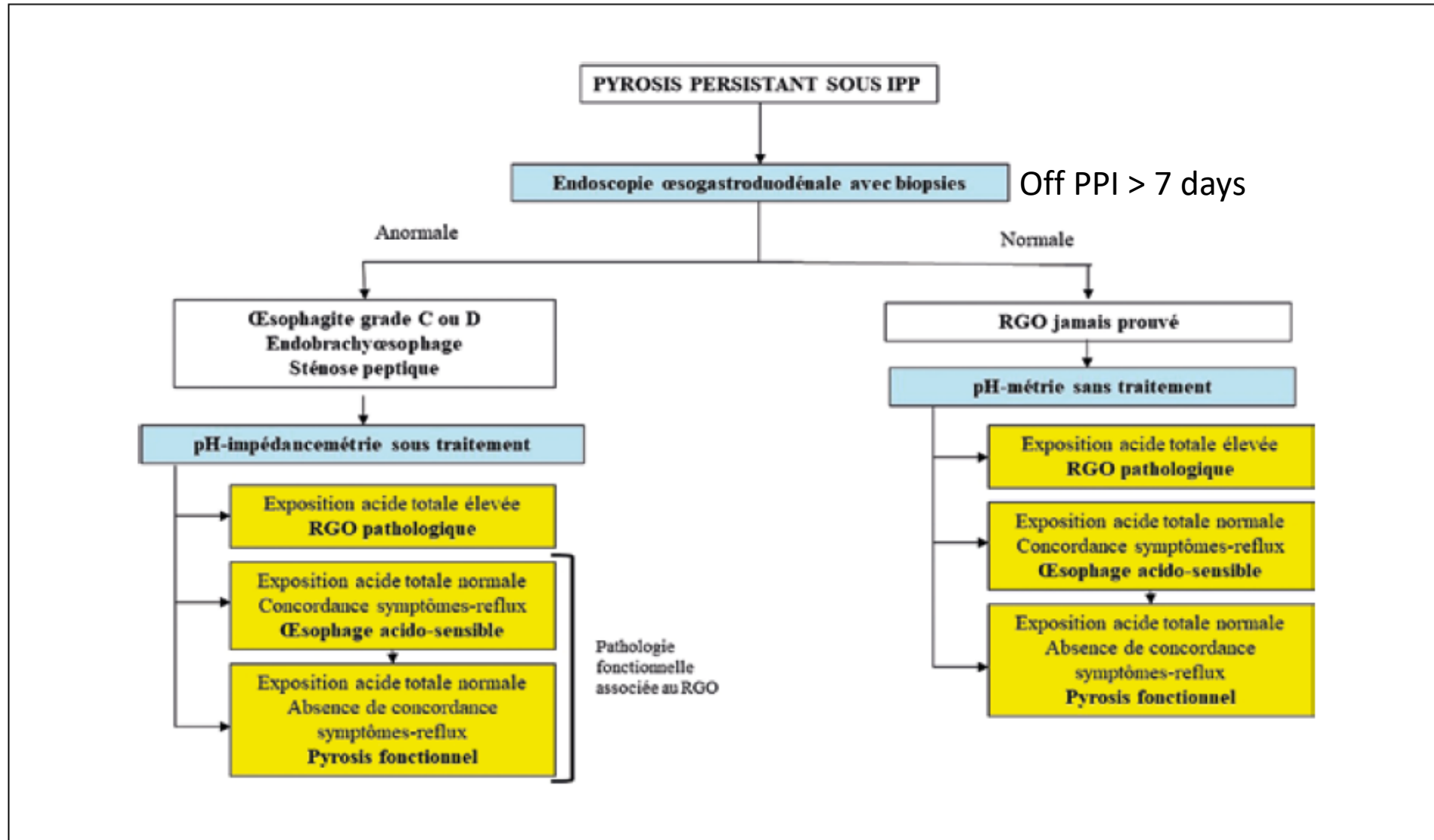


Figure 4 : Les différents phénotypes de RGO au terme des investigations en cas de pyrosis persistant après traitement par IPP optimisé

- Gyawali et al, Modern diagnosis of GERD: the Lyon Consensus. Gut 2018;**67**:1351–1362.
- Zerbib et al, Diagnostic actuel du RGO : Consensus de Lyon (GUT 2018). POST'U 2020

# Ambulatory reflux monitoring

- **Calibration de electrode**

- **Préparation du patient**

  - explications de l'examen (déroulement et buts)

  - marqueur d'événement

  - « carnet de route » agenda

  - arrêt des traitements antisécrétoires (ou pas?)

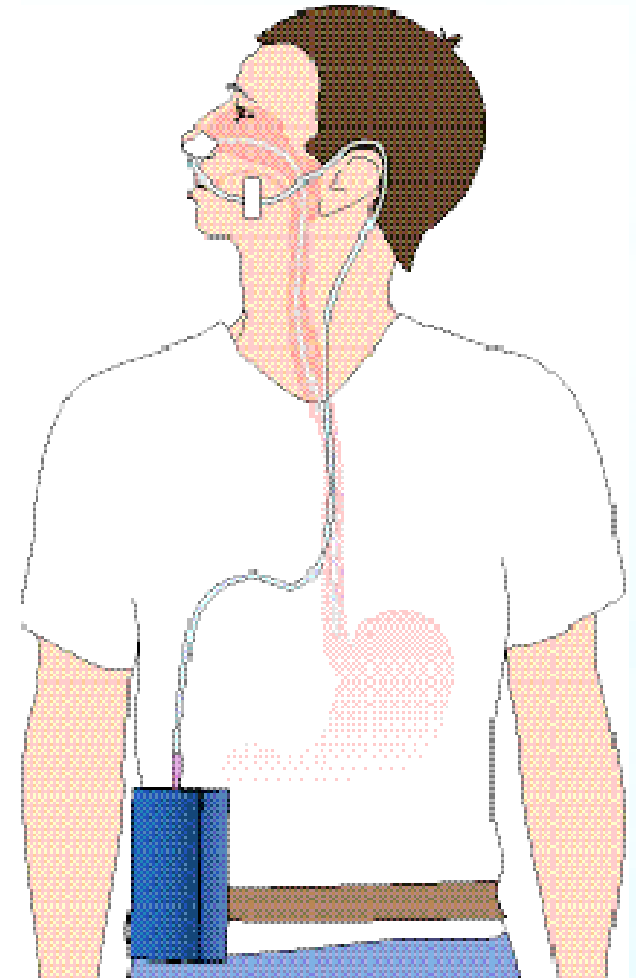


# pHmétrie filaire +/- couplée à l'impédancemétrie

## Réalisation pratique

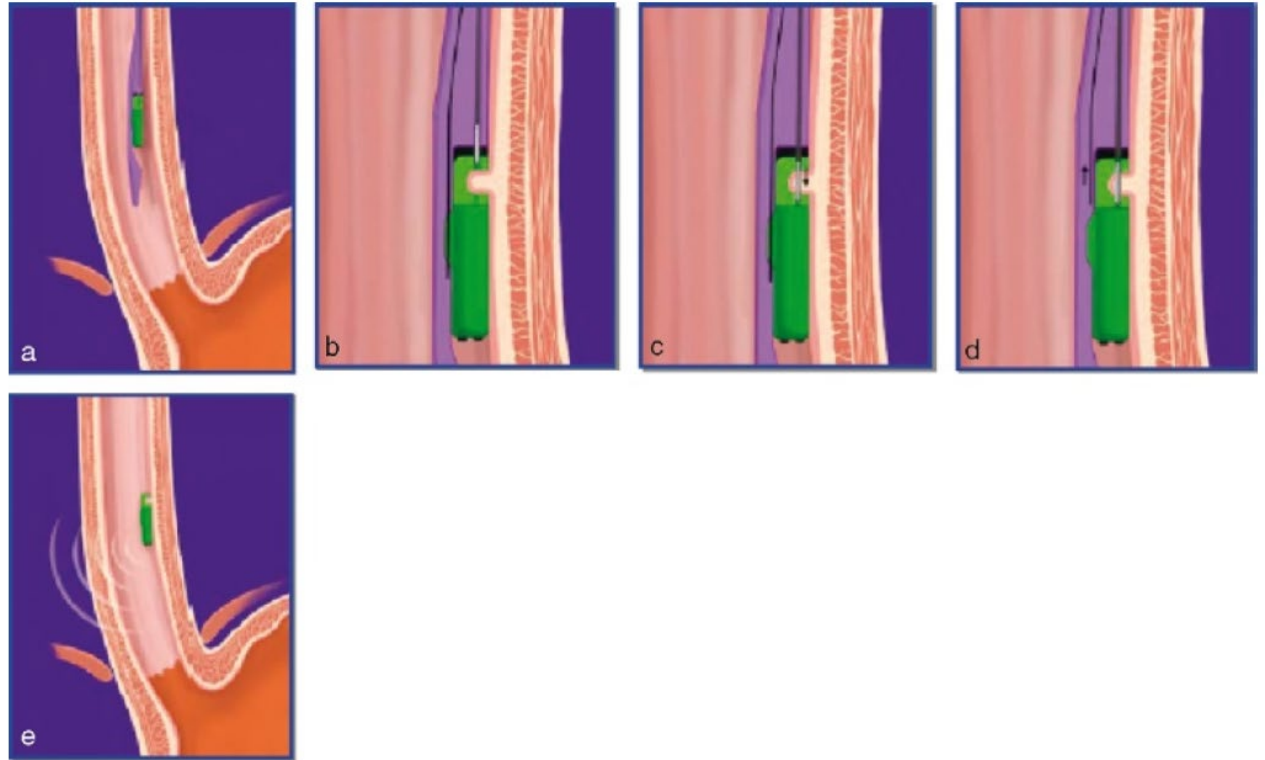
### Pose de la sonde

- à jeun
- introduction par narine (anesthésie locale par spray à la xylocaïne)
- **localisation** extrémité « 5 cm au-dessus du SIO »
  - gradient de pH
  - repérage manométrique
- fixation solide



# pHmétrie par Capsule Bravo®

- La capsule est fixée à la paroi oesophagienne à la hauteur souhaitée à l'aide d'un dispositif de largage soit sous contrôle de la vue lors de l'endoscopie, 6cm au dessus de la ligne Z.
- Electrodes à l'antimoine sans fil Bravo® Medtronic sont des électrodes autonomes qui émettent un signal radiofréquence (433 MHz) dont l'intensité varie en fonction du pH enregistré.
- Permet des enregistrements jusqu'à 96 h, et augmente la sensibilité de l'examen.



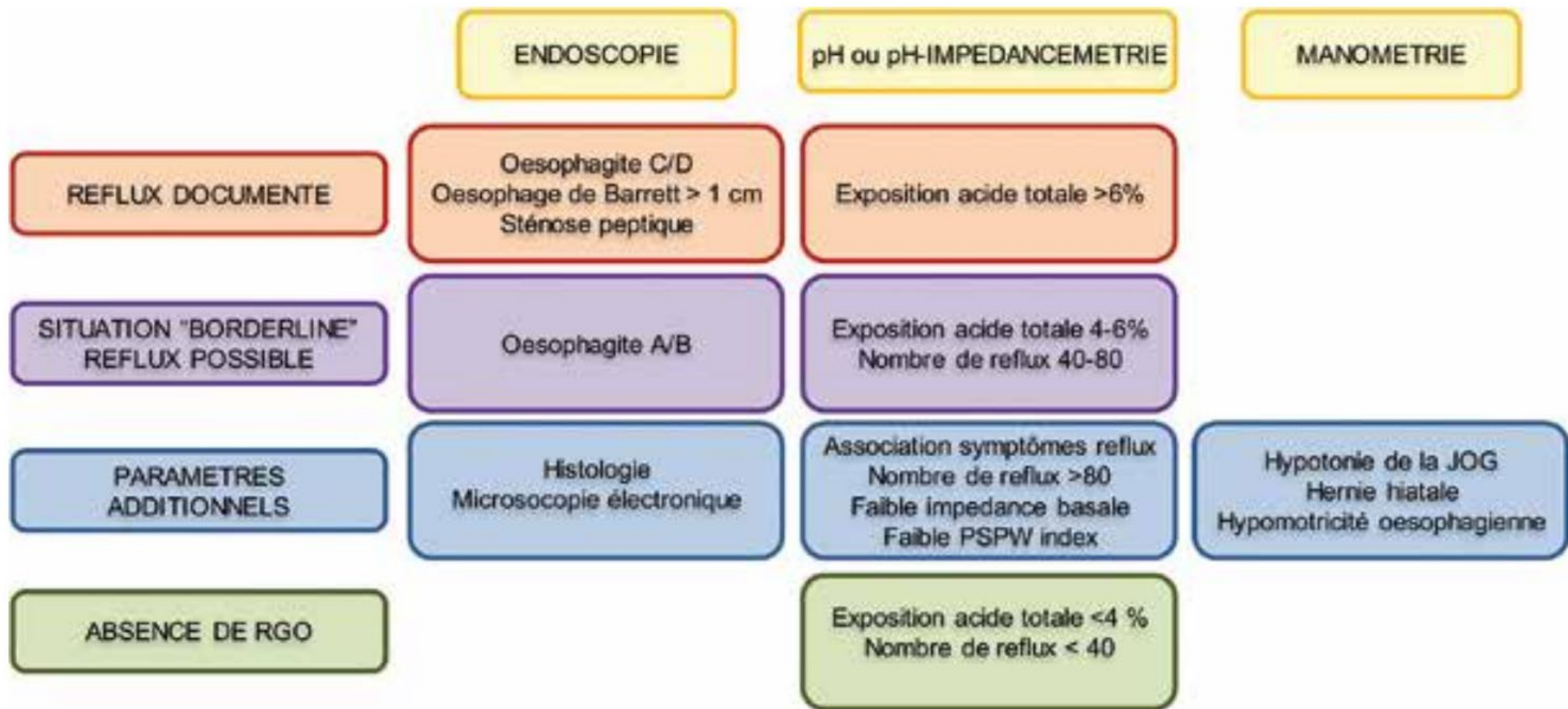
- Le boîtier enregistreur est porté à la ceinture des patients ou en bandoulière.
- Simultanément, le patient signale ses symptômes au niveau du boîtier, pour permettre d'analyser la concordance entre les symptômes ressentis et les épisodes de reflux.
- À l'issue de l'enregistrement, le boîtier est connecté à un ordinateur pour y transférer l'ensemble de l'enregistrement qui est ensuite analysé par le logiciel.

- Critères évalués:

- **Exposition acide oesophagienne:** > 6% ou <4%
- **Nombre total de reflux** (acides et non acides) par impédancemétrie: >80/24 heures ou < 40/24heures
- **Impédancemétrie basale:** MNBI < 2292 ohms
- **index PSPW** (*Postreflux swallow-induced peristaltic wave*)

Tableau 1 : Les index de concordance symptomatique

<ul style="list-style-type: none"><li>▪ <b>Index symptomatique (IS) :</b> positif si <math>\geq 50\%</math></li></ul>	$\frac{\text{Nombre de symptômes associés à un épisode de reflux} \times 100\%}{\text{Nombre total de symptômes signalés}}$
<ul style="list-style-type: none"><li>▪ <b>Probabilité d'association symptomatique (PAS) :</b> positive si &gt; 95 %</li></ul>	Le temps d'enregistrement est divisé en périodes de 2 minutes : chaque période est classée reflux positive ou reflux négative, et symptôme positive ou symptôme négative, ce qui construit une table de contingence. Le test exact de Fisher permet l'analyse des résultats, un $p < 0,05$ permettant de suggérer que la distribution des périodes dans les 4 catégories n'est pas liée au hasard. L'index PAS = $(1-p)/100$ est exprimé en %.

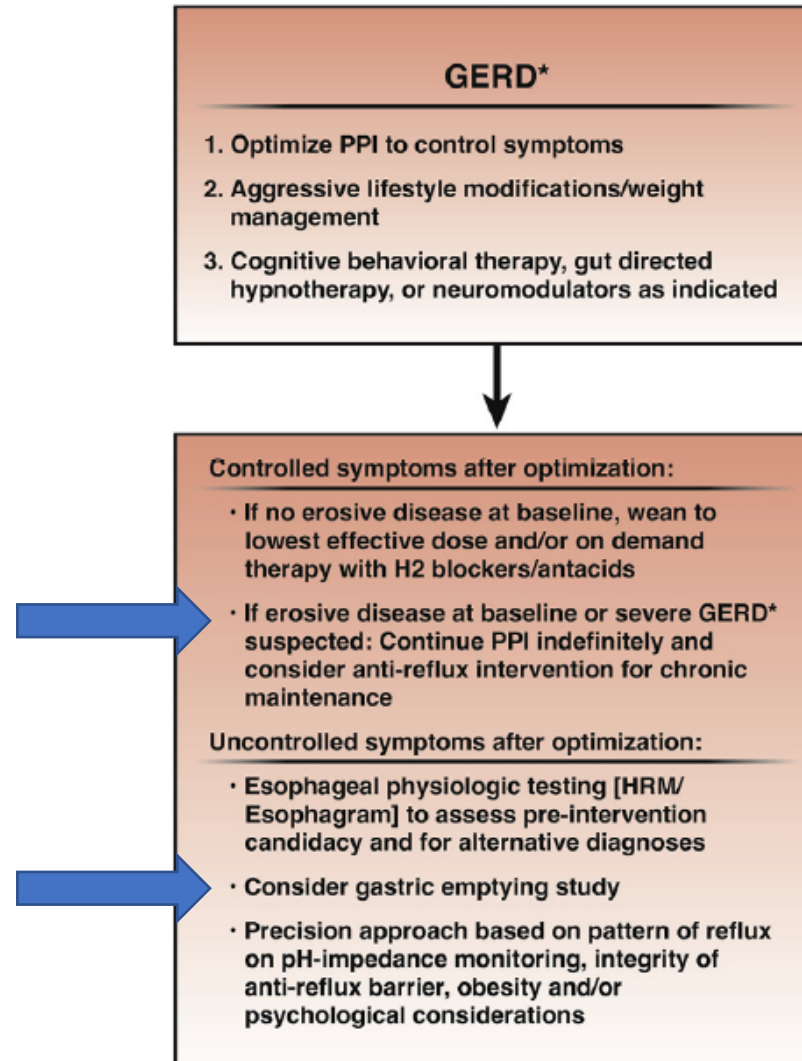


**Figure 3 : Critères diagnostiques du RGO selon le Consensus de Lyon**

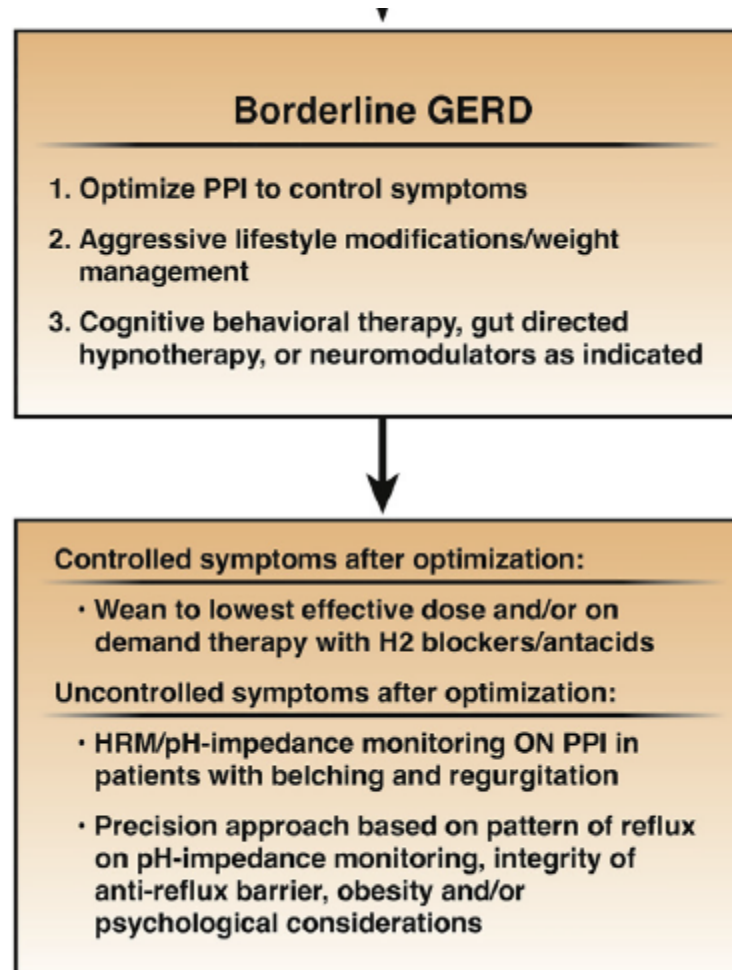
(JOG : Jonction œso-gastrique, PSPW : Postreflux swallow-induced peristaltic wave)

- Gyawali et al, Modern diagnosis of GERD: the Lyon Consensus. Gut 2018;**67**:1351–1362
- Zerbib et al, Diagnostic actuel du RGO : Consensus de Lyon (GUT 2018). POST'U 2020

# Treatment of proven GERD



# Treatment of Borderline GERD



- Clinicians should personalize adjunctive pharmacotherapy to the GERD phenotype, in contrast to empiric use of these agents.
  - alginate antacids for breakthrough symptoms
  - nighttime H2 receptor antagonists for nocturnal symptoms
  - baclofen for regurgitation or belch predominant symptoms
  - prokinetics for coexistent gastroparesis
  
- Candidacy for invasive anti-reflux procedures includes confirmatory evidence of pathologic GERD, exclusion of achalasia, and assessment of esophageal peristaltic function.



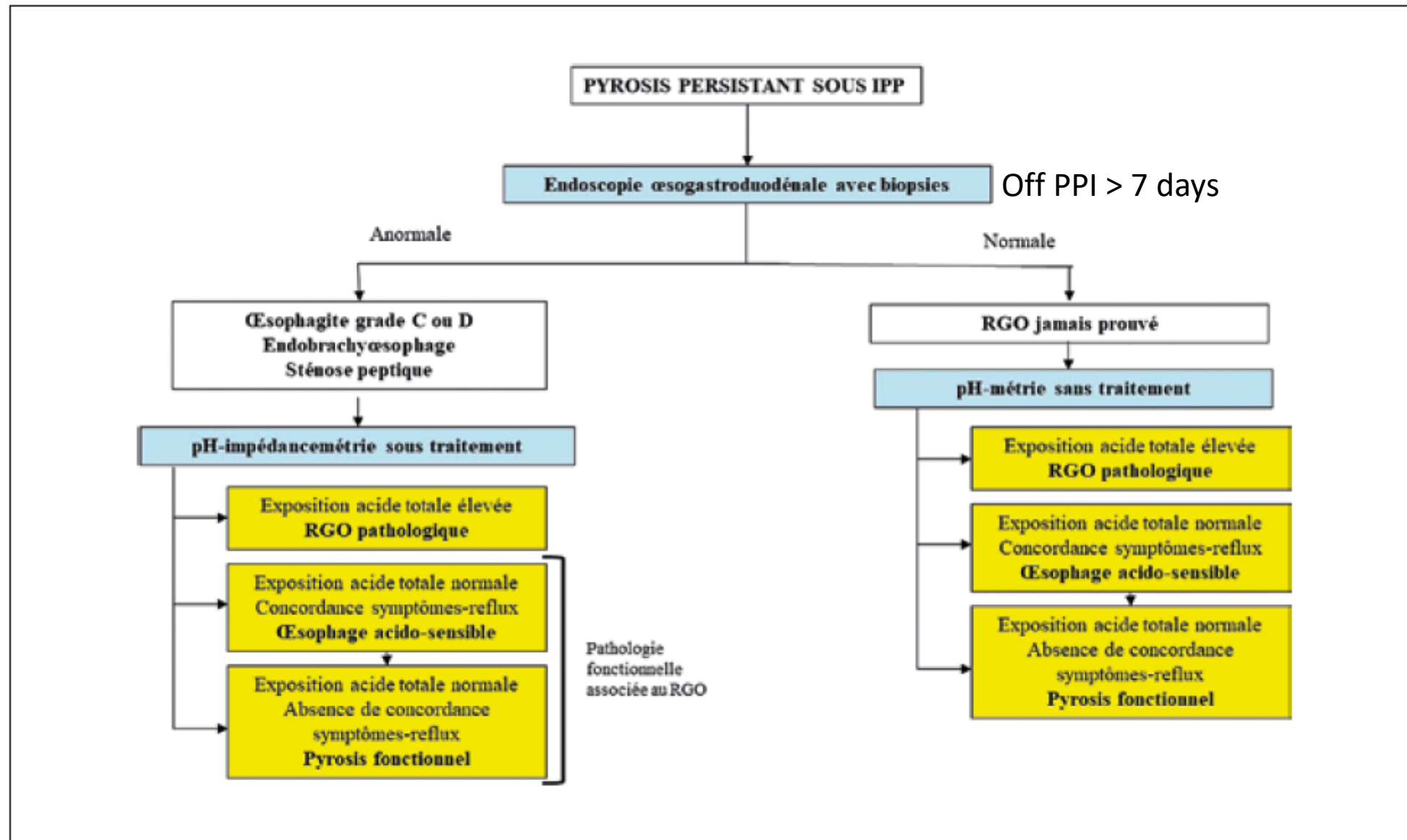


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# No evidence of GERD

- Stop PPI
- HRM if rumination or esophageal motor disorder suspected
- Neuromodulators
- CBT/ Gut directed hypnotherapy/ diaphragmatic breathing, and relaxation strategies



# Outline

- Gastro-esophageal reflux Disease (GERD)
- **Functional heartburn**
- Reflux hypersensitivity



**Ambulatory reflux monitoring**

# Functional heartburn

Diagnosis: Criteria fulfilled for the last 8 weeks with a frequency of at least twice a week

- Burning retrosternal discomfort or pain and No symptom relief despite optimal antisecretory therapy
- upper endoscopy with esophageal biopsies to rule out anatomic and mucosal abnormalities (EoE)
- esophageal high-resolution manometry to rule out major motor disorders
- pH monitoring off PPI therapy to document physiologic levels of esophageal acid exposure in the distal esophagus with absence of reflux–symptom association (ie, negative symptom index and symptom association probability).

N.B: can overlap with proven GERD

- Fass et al., AGA Clinical Practice Update on Functional Heartburn: Expert Review. *Gastroenterology* 2020;158:2286–2293
- Rome IV Clinical Criteria

# Functional heartburn

## Treatment:

- **PPIs** have *no therapeutic value*, the exception being proven GERD that overlaps with functional heartburn.
  - **Lifestyle modifications:** Improved sleep experience
  - **Alternative/complementary medicine:** Acupuncture
  - **Psychological intervention:** Hypnotherapy
- may have benefit as monotherapy in functional heartburn, or as adjunctive therapy  
But no conclusive studies

# Functional heartburn

**Table 2.** Neuromodulator Trials in Functional Heartburn

Class	Drug	Dose	No. of subjects	Outcome	Study type
TCA	Imipramine	25 mg/d	83	No difference than placebo in symptom relief <u>Improved QOL</u>	RCT
SSRI	Fluoxetine	20 mg/d	144	<u>Improvement in percentage of heartburn-free days</u>	RCT
Serotonin agonist (5-HT <sub>4</sub> )	Tegaserod	6 mg bid	42	<u>Decreased frequency of heartburn, regurgitation, and distress</u>	RCT
H <sub>2</sub> RA	Ranitidine	150 mg	18	<u>Decrease in esophageal sensitivity</u>	RCT
Miscellaneous anxiolytics, sedatives, and hypnotics	Melatonin	6 mg bid	60	Improved GERD-HRQOL	RCT

bid, twice per day; H<sub>2</sub>RA, histamine 2 receptor antagonist; HRQOL, health-related quality of life; QOL, quality of life; RCT, randomized controlled trial; SSRI, selective serotonin reuptake inhibitor; TCA, tricyclic antidepressant.

# Functional heartburn

- Based on available evidence, **anti-reflux surgery and endoscopic GERD treatment modalities** have no therapeutic benefit in functional heartburn and should not be recommended.



# Outline

- Gastro-esophageal reflux Disease (GERD)
- Functional heartburn
- **Reflux hypersensitivity**



**Ambulatory reflux monitoring**



# Reflux Hypersensitivity

**Diagnosis:** *Must include **all** of the following* for the last 8 weeks

1. Retrosternal symptoms including heartburn and chest pain
2. Normal endoscopy and absence of evidence that eosinophilic esophagitis is the cause of the symptoms
3. Absence of major esophageal motor disorders (R/O Achalasia, DES, jackhammer esophagus, absent peristalsis)
4. Evidence of triggering of symptoms by reflux events despite normal acid exposure on pH- or pH-impedance monitoring†

†Response to antisecretory therapy does not exclude the diagnosis

# Reflux Hypersensitivity

## Treatment:

1. **Antisecretory agents** in managing of reflux hypersensitivity: controversial (10 /12 patients symptomatic improvement in quality of life metrics on a daily dose of omeprazole)

**H2RAs** can significantly improve esophageal sensitivity

2. Patients meeting the diagnostic criteria for reflux hypersensitivity with *symptoms refractory to max-dose antisecretory therapy* should be considered for antidepressant therapy including **TCAs, SNRIs, or SSRIs (citalopram: a near 50% reduction (38.5% vs 66.7%, p = 0.021) in esophageal symptoms; Viazis et al.)**

3. **Surgical therapy (laparoscopic Nissen fundoplication)** > active medical therapy (omeprazole + baclofen), and control medical therapy (omeprazole+ placebo) in measured by quality of life metrics

( →evaluate case by case)

4. **Hypnotherapy** has also been identified as a potential non-pharmacologic option for patients with esophageal disorders



# Outline

- Dysphagia
  - Functional dysphagia
  - Esophageal Motor disorders

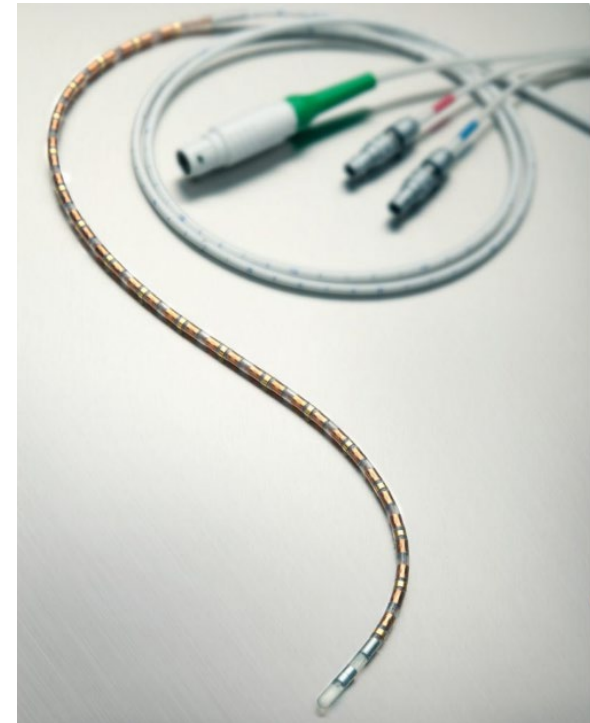
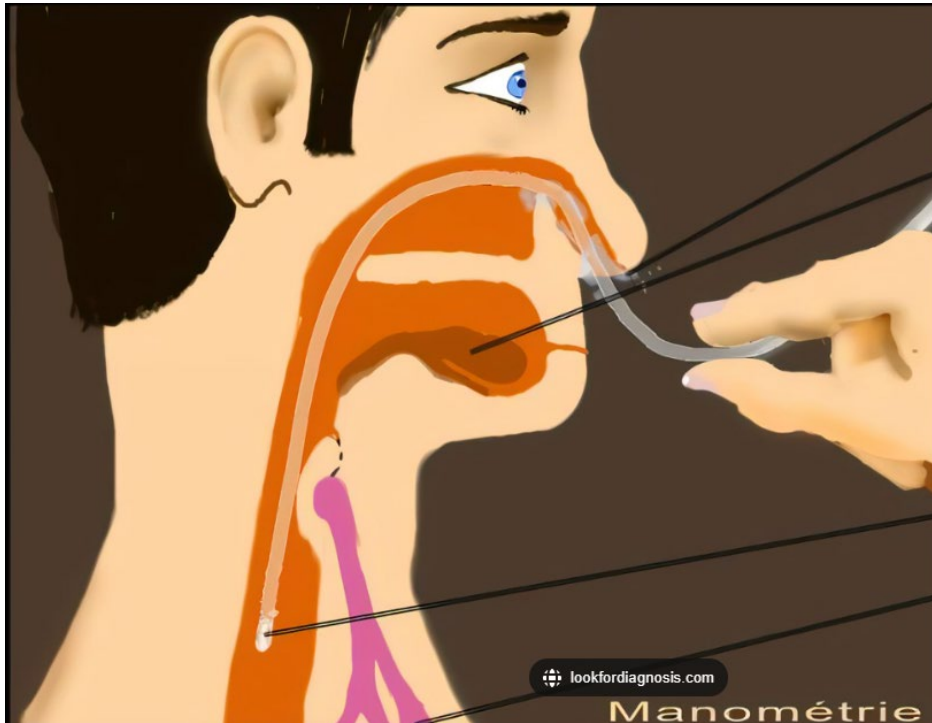
} **High Resolution esophageal Manometry (HRM)**  
**Endo-FLIP**

# Functional Dysphagia

**Clinical Diagnostic criteria** *Must include **all** of the following* fulfilled for the last 8 weeks

1. Sense of solid and/or liquid foods sticking, lodging, or passing abnormally through the esophagus
2. Absence of evidence that esophageal mucosal or structural abnormality is the cause of the symptom
3. Absence of evidence that gastroesophageal reflux or eosinophilic esophagitis is the cause of the symptom
4. Absence of major esophageal motor disorders (Achalasia/EGJ outflow obstruction, diffuse esophageal spasm, jackhammer esophagus, absent peristalsis)

# HRM esophagus



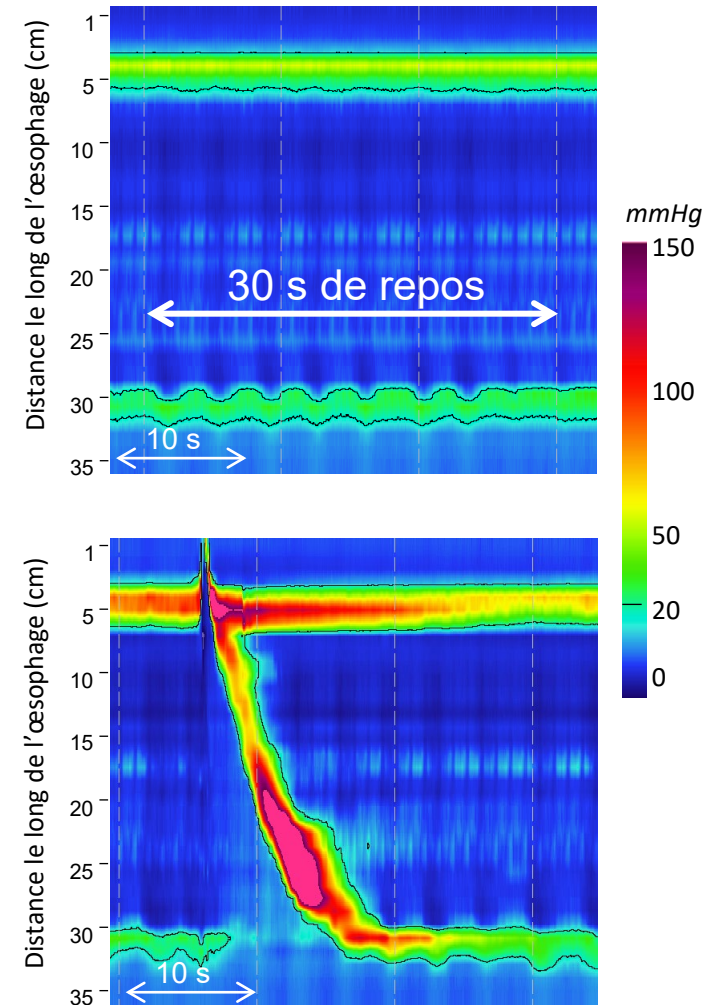
- **The Chicago Classification v4.0 (CCv4.0)** is the updated classification scheme for esophageal motility disorders using metrics from high-resolution manometry (HRM).

- Au moins 30 s sans déglutition

- Évaluation de la morphologie et de la pression de la JOG

- Déglutitions de 5 ml d'eau

- Évaluation de la relaxation de la JOG et des contractions œsophagiennes



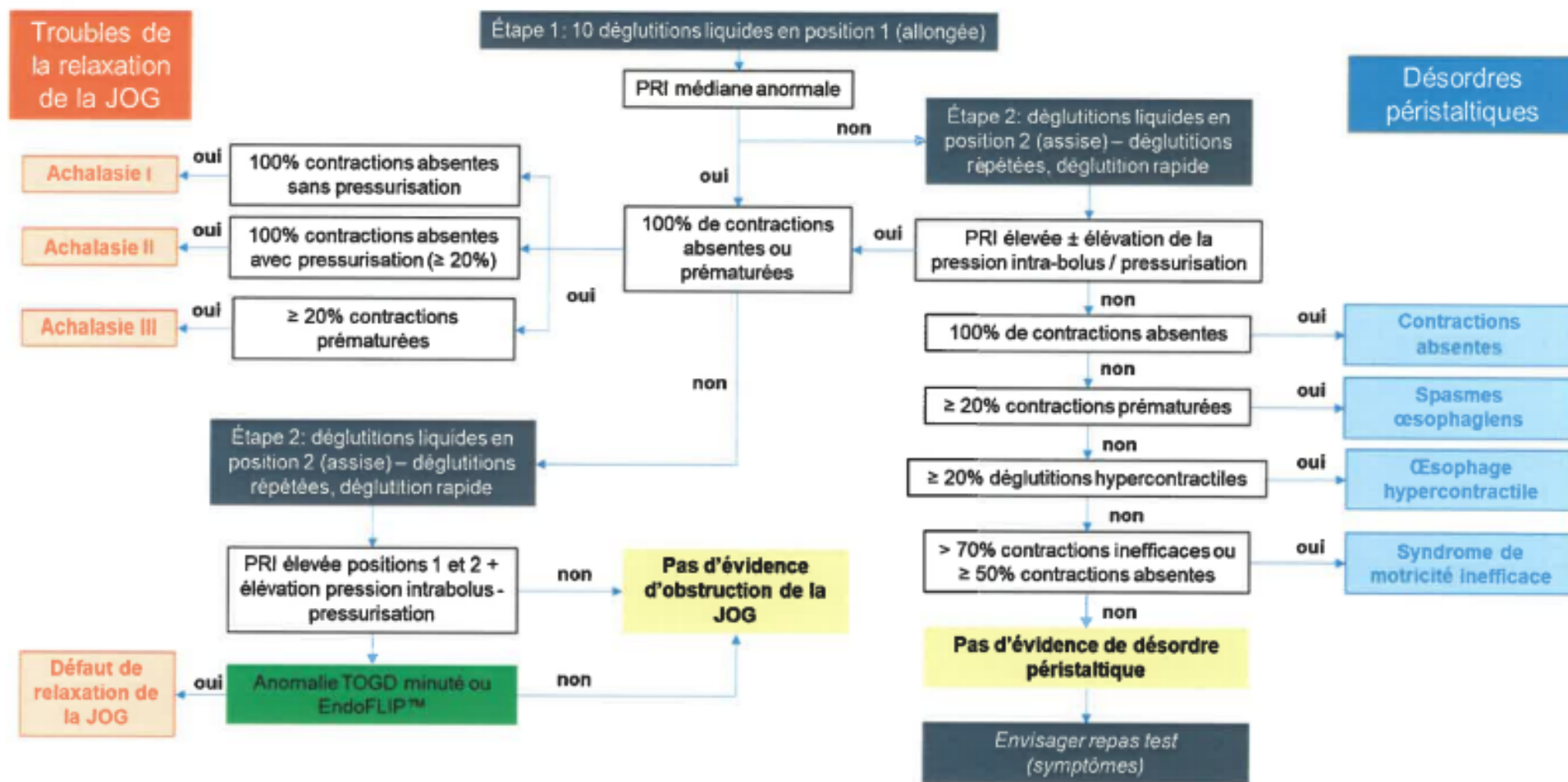
## Classification de Chicago v4.0

Les troubles moteurs œsophagiens sont répartis en 2 catégories : les troubles de la relaxation de la jonction œso-gastrique (JOG) et les désordres péristaltiques.

L'analyse de la manométrie comporte l'évaluation des 10 déglutitions en position 1 (allongée le plus souvent) puis en position 2 (assise). La pression de relaxation intégrée (PRI) médiane est étudiée en position allongée et assise puis les contractions œsophagiennes sont évaluées.

Pour le diagnostic d'achalasia, il est possible de réaliser l'examen uniquement en position 1 si la PRI est élevée et s'il y a 100% de contractions absentes ou prématurées.

Le diagnostic de défaut de relaxation de la JOG nécessite une PRI élevée en position 1 et en position 2.

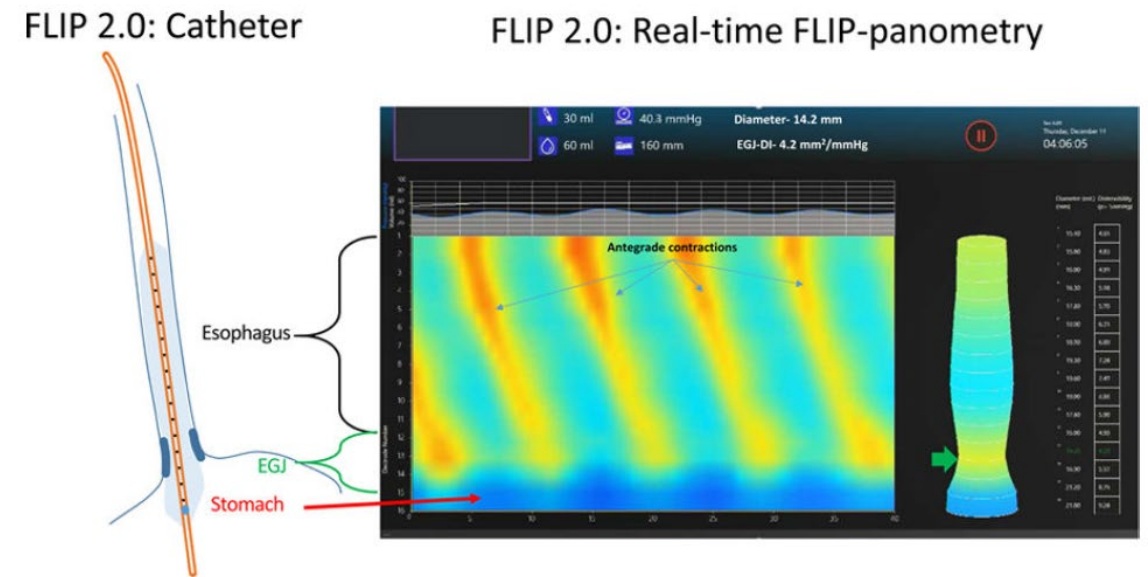


TOGD : transit œso-gastro-duodéal

- Société Nationale Française de Gastro-Entérologie, Conseil Pratique, manométrie œsophagienne de haute résolution et classification de Chicago des troubles moteurs œsophagiens, Sabine Roman, se basant sur
- Yadlapati et al, Esophageal motility disorders on high-resolution manometry: Chicago classification version 4.0<sup>®</sup>. Neurogastroenterol Motil. 2021 Jan;33(1):e14058

# endoFLIP (Functional Lumen Imaging Probe)

- clinical utility as both a diagnostic tool and as a device which can be used to guide and measure response to therapy.
- placed in a sedated patient at the time of endoscopy and can be placed and performed in less than 5 minutes.
- placed transorally and is positioned within the esophagus through the identification of the waist on a display figure with 20 mL of saline in the balloon.
- Once the catheter is at the correct position, the balloon is distended typically step-wise in 10 mL increments up to 70 mL.



**Figure 1:** Diagram of catheter and placement through the EGJ. The FLIP 2.0 display provides real-time measurement of the EGJ-DI that is measured as the narrowest CSA [green arrow] divided by the simultaneous pressure. The pattern represents a normal response to volumetric distention and is defined as repetitive antegrade contractions (RACs).  
*Courtesy of the Esophageal Center at Northwestern, Chicago, IL.*

- Donnan et al, EndoFLIP in the Esophagus: Assessing Sphincter Function, Wall Stiffness, and Motility to Guide Treatment. *Gastroenterology Clinics of North America*. 2020 Sep;49(3):427-435.
- Hirano et al, Functional Lumen Imaging Probe for the Management of Esophageal Disorders: Expert Review From the Clinical Practice Updates Committee of the AGA Institute. *Clin Gastroenterol Hepatol*. 2017 Mar;15(3):325-334.



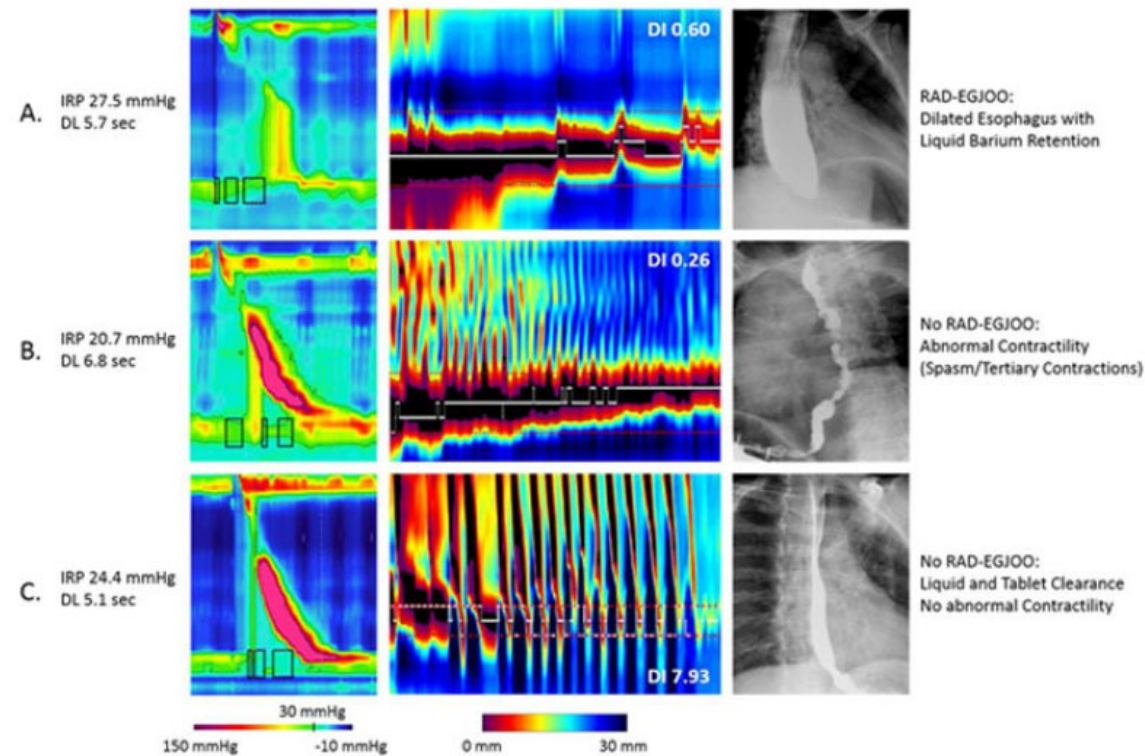
# endoFLIP

- Normal parameters of FLIP panometry are EGJ-DI greater than 2.8 mm<sup>2</sup>/mm Hg
- The FLIP can be helpful clinically to
  - diagnose achalasia in patients with features of achalasia that do not meet the manometric criteria for achalasia
  - Distinguish true EGJOO
  - utilized in EoE to assess esophageal narrowing and the mechanical characteristics of the esophageal body
- Ongoing studies are evaluating the applications of FLIP to GERD interventions targeting the esophagogastric junction as well as other foregut disorders

- Donnan et al, EndoFLIP in the Esophagus: Assessing Sphincter Function, Wall Stiffness, and Motility to Guide Treatment. *Gastroenterology Clinics of North America*. 2020 Sep;49(3):427-435.
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# endoFLIP

## FUNCTIONAL LUMINAL IMAGING PROBE PANOMETRY: A METHOD TO DISTINGUISH TRUE EGJOO



- Donnan et al, EndoFLIP in the Esophagus: Assessing Sphincter Function, Wall Stiffness, and Motility to Guide Treatment. *Gastroenterology Clinics of North America*. 2020 Sep;49(3):427-435.
- Hirano et al, Functional Lumen Imaging Probe for the Management of Esophageal Disorders: Expert Review From the Clinical Practice Updates Committee of the AGA Institute. *Clin Gastroenterol Hepatol*. 2017 Mar;15(3):325-334.

# Treatment of Achalasia

- We suggest **additional testing using CT or endoscopic ultrasound** only in those achalasia patients suspected of malignant pseudo-achalasia: >55 yo, duration of symptoms 10 kg, severe difficulty passing the LOS with a scope
- Treatment decisions in achalasia should be made based on patient-specific characteristics, the patient's preference, possible side effects and/or complications and a centre's expertise.
  - Overall **repetitive PD (pneumatic dilation), LHM (Laparoscopic Heller Myotomy) and POEM (per Oral Endoscopic Myotomy)** , graded have comparable efficacy.
  - **Botox therapy** should be reserved for patients who are too unfit for more invasive treatments, or in whom a more definite treatment needs to be deferred.
  - We suggest **against the use of calcium blockers, phosphodiesterase inhibitors or nitrates** for the treatment of achalasia

# Treatment of functional dysphagia

- lifestyle modifications and avoidance of triggers, neuromodulators, and management of psychological comorbidities.
- Nonpharmacologic management includes bougie dilation and in carefully selected patients botulinum toxin injections into the distal esophagus.
- Functional dysphagia remains an area of active research likely to evolve



Thank you

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Questions?

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