Screening of Barrett: Is it cost-effective? Is there a high-risk population?

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Barrett’s esophagus (BE) is an acquired condition in which the normal squamous epithelium of the esophagus is replaced by a metaplastic columnar lining.

**Double definition:**
- **endoscopic:** “there is a glandular mucosa at the lower part of the esophagus”
- **histologic:** “this glandular mucosa is a specialized intestinal metaplasia”

This change is strongly related to chronic gastroesophageal reflux (GERD).

10-15% of GERD patients have Barrett’s esophagus.
GERD

Barrett’s esophagus

Low Grade Dysplasia

High grade dysplasia

Invasive carcinoma
GERD

Barrett’s esophagus

Low Grade Dysplasia

High grade dysplasia

Invasive carcinoma
GERD

Barrett’s esophagus

Low Grade Dysplasia

High grade dysplasia

Invasive carcinoma

Screening?

2 PARTS
GERD

Barrett’s esophagus

Low Grade Dysplasia

High grade dysplasia

Invasive carcinoma

Screening?

2 PARTS
GERD Screening?

- Barrett’s esophagus
- Low Grade Dysplasia
- High grade dysplasia
- Invasive carcinoma

Cost Effective using endoscopy

Kastelein F Gut 2015
GERD

Barrett’s esophagus

Low Grade Dysplasia

High grade dysplasia

Invasive carcinoma

Screening?

Cost effectiveness???
Screening of Barrett’s esophagus is a highly debated topic........
Screening of Barrett’s esophagus

PROS
Some interesting prerequisites…..

CONS
Screening of Barrett’s esophagus

PROS
Some interesting prerequisites.....

CONS
Pros......

1- RISING INCIDENCE OF ESOPHAGEAL ADENOCARCINOMA

Last 3 decades in western countries
Germany: incidence X 7
Pros.....

2- POOR PROGNOSIS of ESOPHAGEAL CARCINOMA
Pros........

2- POOR PROGNOSIS of ESOPHAGEAL CARCINOMA

5 year survival: 15-50%
Pros ........

3- A WELL ESTABLISHED PREMALIGNANT CONDITION

The Barrett’s esophagus
High grade Dysplasia?
Non dysplastic Barrett

NBI + Acetic acid
Moins de risque de « rater » des anomalies macroscopiques

NBI + Acetic acid
High grade dysplasia
Pros......

4- EARLY DETECTION of BARRETT’S ESOPHAGUS
May lead to better survival and may save lifes
4,978 SEER-Medicare patients identified with esophageal adenocarcinoma

Only 577 (12%) had preexisting BE

BE patients had overall lower stage (28.5% stage I vs. 12.8% stage IV) than those without preexisting BE (16.4% stage I vs. 30.6% stage IV).

Overall survival was better among patients in the BE group (hazard ratio (HR), 0.56; 95% confidence interval (CI), 0.50-0.61)

After adjusting for lead-time bias, the HRs attenuated to null

*Tramontano AC, Am J Gastroenterol 2017*
5- EARLY ENDOSCOPIC TREATMENT OF HIGH GRADE DYSPLASIA on BARRETT’S ESOPHAGUS leads to better survival and saves lifes
Screening of Barrett’s esophagus

PROS
Some interesting prerequisites.....

CONS
CONS

To promote screening of a disease, some factors are also mandatory:

1- a well defined population to screen
2- a low cost of the screening method
3- a high acceptance rate of the screening method
CONS .......

1- The risk is not so high

2- a well defined population to screen?

3- a low cost of the screening method?

4- a high acceptance rate of the screening method?
CONS

1- The risk is not so high

2- a well defined population to screen?

3- a low cost of the screening method?

4- a high acceptance rate of the screening method?
Cons....
Risk of Barrett not so high....

1- Recent data indicate that the incidence of cancer in Barrett’s esophagus is lower than in the first cohort studies: 1 per 400 pts per year

2- Subjects with Barrett’s esophagus have the same age-adjusted life expectancy than the general population and no decrease in mortality has been demonstrated in patients who are undergoing surveillance

3- In cohort study, the evolution of patients with Barrett’s esophagus mainly depends on other diseases
### Screening: the risk of cancer?

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1 per 200 pts per year
The risk of cancer?

More recently………

Risk = 1 per 400 pts or less: 1 per 600 pts

0.27%: Wani SB, Gastroenterology 2010;138:475c.
0.22%: Bhat J Nat Cancer Inst 2011; 103: 1047-1059
0.3%: Desai TK Gut 2012; 61: 970-976
0.14%: Holmberg D Eur J Cancer 2017; 75; 41-46

Risk level stays the same after 5 years of F-U
N’Guyen T Am J Gastroenterol 2017
CONS ........

1- The risk is not so high

2- a well defined population to screen?

3- a low cost of the screening method?

4- a high acceptance rate of the screening method?
Screening: a population to screen?

1- Recent data also indicate that the prevalence of Barrett’s esophagus is higher than suggested by previous data: 10-25% in pts referred for screening colonoscopy.

2- 40% of patients with esophageal carcinoma do not experience GERD and would not be detected through screening programs.

This means: even if there is a high-risk group (white>50y with long history of heatburn), the population to screen is very large.
CONS

1- The risk is not so high

2- a well defined population to screen?

3- a low cost of the screening method?

4- a high acceptance rate of the screening method?
Is screening Barrett’s esophagus cost-effective using endoscopy?
AGA Chicago workshop Sharma GE 2004

Endoscopic screening of Barrett’s esophagus is not cost-effective in general population

In a group at risk?
Endoscopic screening of Barrett’s esophagus is not cost-effective in white adults age > 50y with > 5-10 years of heartburn because a large majority of cases will be missed

With a different method? (less expensive)
Cost-effectiveness analysis

$95,559 per quality-adjusted life year QALY saved.

The prevalence rates of esophageal adenocarcinoma, would have to increase by 654% to generate an incremental cost-effectiveness ratio (ICER) of less than $50,000 per QALY.

So cost still too high

Gupta N GIE 2011
Alternative tests to improve the tolerance and acceptance to reduce cost

1- nasogastroscope
2- esophageal capsule
3- cytosponge
Alternative tests to improve the tolerance and acceptance to reduce cost

1- nasogastroscope
2- esophageal capsule
3- cytosponge
Nasogastroscope

Video 5 mm
one plan bending

Single-use sheath
Vision sciences
65 cm
operating channel
diameter: 5.1mm
SFED study, 500 pts, 10 centers, randomized study oral standard vs naso

Number of pts refusing another procedure in the same conditions:

Oral gastroscopy: 25.2%  
Nasogastroscopy: 10.3%  
p<0.001
All studies demonstrate that:

1) nasal approach (except 2 studies)
2) reduction in endoscope diameter
improve patient tolerance to gastroscopy


Without negative effect on the quality of biopsies (1335 pts)
Walter T J Clin Gastroenterol 2010
Alternative tests to improve the tolerance and acceptance to reduce cost

1- nasogastroscope
2- esophageal capsule
3- cytosponge
Esophageal capsule
Could videocapsule be helpful for the detection of Barrett’s esophagus?

First problem: no biopsies

Second problem: Sensitivity = 77%

Bhardwaj A, Am J Gastroenterol 09 Metanalysis, 9 studies, 618 pts

Better application: dg and f-u of eso varices
Alternative tests to improve the tolerance and acceptance to reduce cost

1- nasogastroscope
2- esophageal capsule
3- cytosponge
Cytosponge

Best 1 study
501 participants
Sensitivity 73%, specificity 94% if BE > 1cm

Best 2 study
1110 participants
Sensitivity 87%, specificity 92% if BE > 3cm

CONCLUSION

Incidence of esophageal car is rising
But screening for BE is still not cost-effective

We need a better test