How to increase detection of dysplasia in Barrett’s esophagus?

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Shortcomings of all (!) imaging studies on Barrett’s

Studies have been performed in ...

- ... high experts centres,
- ... evaluating new tools,
- ... with individual and commercial pressure,
- ... selected patients (pre-test likelihood) with a fairly
- ... high incidence of neoplasia

⇒ Diagnostic accuracy may not reflect a real world situation
⇒ Some things might still be helpful in our daily practise
What might influence detection rate?

- Chromo
- NBI (et al.)
- High-Def
- OCT
- CLE

- Time?
- Sedation?
- Flushing?
- Caps?
- Experience

Sophisticated tools
=> many data

Basic tools
=> sparse data
Chromo-endoscopy for detection of Barrett’s dysplasia?

Ngamruengphong S, Gastrointest Endosc. 2009

Figure 3. IY (%) for individual studies and pooled data for detection of dysplasia with MB chromoendoscopy compared with standard RB (random-effects model, $P = .06$); the test for heterogeneity was $\chi^2 = 33.22$ ($P < .0001$, $I^2 = 75.9\%$).
Acetic acid?

- Acetic acid $\rightarrow$ acetowhitening after application $\rightarrow$ disappearance related to neoplasia
- 142 sec. $\rightarrow$ sens. 98%, spec. 84% for HGD/EMC

_Longcroft-Wheaton et al., Endoscopy 2013_
Chromo or NBI for detection of Barrett’s dysplasia?

Qumseya et al., Clin Gastro Hepatol 2013
NBI targeted biopsies or HD-WLE with random biopsies?

• International, randomized, crossover trial involving 123 patients
• Dysplastic areas detected: NBI 30% vs. HD-WLE 21% (p=0.01)
• “Biopsies could be entirely avoided in patients who have only regular appearing NBI surface patterns”

=> 30% dysplasia in a screening and surveillance population???

Sharma et al., GUT 2013
Confocal laser endomicroscopy for detection of neoplasia in Barrett's esophagus: a meta-analysis

Diseases of the Esophagus 2015  Wu et al
OCT/ volumetric laser endomicroscopy
OCT/ volumetric laser endomicroscopy (vs pCLE) for dysplasia in BE

Cadman et al., GIE 2015
Comparison of various image modalities?

- Apart from direct comparison, there is no great difference on which respective method is used. Sens/Spec 90%, NPV<90%
- Diagnostic yield is increased by about 30% with almost any “new“ method
- Policy of targeted biopsy is reasonable!
- However, despite all these innovations ...

... there is no red-flag-technology, and
... obtaining systematic biopsies in addition to targeted biopsies is still required!!
Basic tools?

- Significantly more lesions in specialized Barrett’s units
  Cameron et al., GIE 2014
- Inspection time correlates with HGD/EAC-detection rate (> 1 min per cm)
  Gupta et al., GIE 2012
- Transparent cap helps to detect significantly more Barrett (non-dysplastic BE)
  Cheng et al., WJG 2014
- Effect of sedation? Flushing with water or anti-foaming agents? => No published data
Non-endoscopic detection of dysplasia in Barrett’s

*Ross-Ines et al., PLOS Med 2015*

<table>
<thead>
<tr>
<th>Patients</th>
<th>Total Number</th>
<th>TFF3 Positive</th>
<th>TFF3 Negative</th>
<th>Sensitivity (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All BE patients (≥C1 or ≥M3)</td>
<td>596</td>
<td>476</td>
<td>120</td>
<td>79.9% (76.4%–83.0%)</td>
</tr>
<tr>
<td>Segment length</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥C1</td>
<td>533</td>
<td>434</td>
<td>109</td>
<td>79.5% (75.9%–82.9%)</td>
</tr>
<tr>
<td>≥C2</td>
<td>416</td>
<td>349</td>
<td>67</td>
<td>83.9% (80.0%–87.3%)</td>
</tr>
<tr>
<td>≥C3</td>
<td>320</td>
<td>279</td>
<td>41</td>
<td>87.2% (83.0%–90.6%)</td>
</tr>
<tr>
<td>Dysplasia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NDBE</td>
<td>372</td>
<td>294</td>
<td>78</td>
<td>79.0% (74.5%–83.0%)</td>
</tr>
<tr>
<td>Indefinite for dysplasia</td>
<td>46</td>
<td>34</td>
<td>12</td>
<td>73.9% (58.9%–85.7%)</td>
</tr>
<tr>
<td>LGD</td>
<td>77</td>
<td>63</td>
<td>14</td>
<td>80.5% (69.9%–88.7%)</td>
</tr>
<tr>
<td>HGD/IMC</td>
<td>101</td>
<td>85</td>
<td>16</td>
<td>84.2% (75.6%–90.7%)</td>
</tr>
<tr>
<td>Patients having two Cytosponge tests</td>
<td>107</td>
<td>95</td>
<td>11</td>
<td>89.7% (82.3%–94.8%)</td>
</tr>
</tbody>
</table>
Tethered Capsule using OCT for screening for Barrett’s dysplasia?

Gora et al., Nature Med 2013
Conclusion

• Everything that offers more information helps!
• High-Def-WLE, acetic acid, an experienced examiner and time might be most relevant
• Quality parameters for detection of Barrett’s dysplasia???
  – ADR/AMR?
  – Time needed?
  – Rate of interval lesions?
  => NO! (International Consensus; Sharma et al Gastro 2015)
• Problem: many colonic adenomas, CRC-screening is widely practiced ⇔ few dysplastic Barrett’s, no screening programs, only small clinical trials and observational studies
Further recommendation for reading

BRIEF REVIEW

The Clinical Consequences of Advanced Imaging Techniques in Barrett’s Esophagus

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