Confocal microscopy as an alternative microscopic diagnosis that saves time and money for pathology departments: pilot study on colorectal polyps

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CRC screening in average-risk population

- U.S. Preventive Services Task Force
- U.S. Multi-Society Task Force on Colorectal Cancer
- American Cancer Society
- AEG – semFYC - Cochrane

**Evidence:** 1a
**Recommendation:** A

Colonoscopy findings in positive blood in stool

**Remarkable Findings**
- Low-risk adenomas
- Irrelevant hemorrhoids and diverticula

**Advanced colorectal neo-plasms** (CRC and high-risk adenoma)
- 6-7%
- Colonoscopy findings in positive blood in stool

**Advanced adenoma**
- Size ≥1 cm
- Villous component
- High-grade dysplasia

Courtesy of Dr. JM. Augé (H. Clínic)
Hypothesis
The increasing number of colonoscopies has created bottlenecks in pathology departments due to the huge number of samples to be analysed.

Objective
We aim to use alternative ways of diagnosis to overcome such bottlenecks.
12 patients
20 polyps

Confocal laser microscopy
(VivaScope® 2500M-G4TM)

Conventional histopathologic processing

Regular diagnosis
(Haematoxylin and eosin)

3 blind pathologists
Patients and Methods

Cases Included

- 18/20 (90%) tubular adenomas
- 2/20 (10%) sessile serrated adenomas/polyps
Results

• Confocal diagnosis was reliable and concordant with H&E in 100% cases
  – Some histological details were difficult to evaluate due to image resolution issues

• A consensus meeting was made in order to establish the diagnostic features to be assessed
Pathological Features

<table>
<thead>
<tr>
<th>Case</th>
<th>Image</th>
<th>Normal mucosa</th>
<th>Crypt’s base</th>
<th>Crypt’s tip</th>
<th>Low-grade dysplasia</th>
<th>High-grade dysplasia</th>
<th>Basal dilation</th>
<th>Sawtooth serration</th>
<th>Muscularis mucosae</th>
<th>Muscular propria</th>
<th>Confocal diagnosis</th>
<th>H&amp;E diagnosis</th>
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Normal Mucosa

Confocal microscopy

Haematoxylin & eosin
Low-grade Dysplasia
Low-grade Dysplasia
Low-grade Dysplasia
Low-grade Dysplasia
High-grade Dysplasia
Basal Dilation
Basal Dilation
Sawtooth Serration
Sawtooth Serration
Muscularis mucosae
Muscularis propria
Limitations

• Learning curve
• Sample orientation
• Polyps and colonic mucosa are tender tissues, which hinders confocal evaluation
• Variability of samples
Conclusions

- Confocal microscopy allows whole scanning of the tissue in real time and does not interfere with a subsequent pathological analysis.
- It provides high reliability and reproducibility compared to gold standard diagnostics.
- Time-saving and limited required personnel.
- The rising workload in pathology departments may be reduced.