Anal dysplasia detection during routine screening colonoscopy

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Abstract

Introduction: Anal squamous intraepithelial lesion precedes anal cancer. Inspection of the epithelium at risk for anal dysplasia is an integral part of routine screening colonoscopy. Detection of anal squamous intraepithelial lesions during screening colonoscopy is possible using standard techniques and currently available instruments.

Results: Fifteen low-grade and 10 high-grade squamous intraepithelial lesions were found incidentally at screening colonoscopy in 25 patients [F/M 16/9; median age 59 (46-82)]. A review of the medical record did not reveal risk factors for anal squamous cell cancer. Thirteen low-grade and 12 high-grade lesions subsequently were identified by chromoendoscopy with narrow band imaging/acetic acid and ablated.

Conclusions: Anal squamous intraepithelial lesions can be detected at routine screening colonoscopy. Screening for anal SIL is an integral part of every colonoscopic examination since the at-risk epithelium is crossed at the beginning and at the end of every procedure. Focused examination of the ATZ and anal canal during routine screening colonoscopy affords an opportunity to increase detection of anal SIL, the precursor to anal squamous cell carcinoma. Lesions detected can reproducibly be reidentified and ablated by chromoendoscopy using techniques and instruments familiar to all endoscopists.

Keywords: Anal dysplasia, Squamous intraepithelial lesion, screening colonoscopy, human papillomavirus, chromoendoscopy, narrow band imaging

Introduction

Examination of the anal epithelium at-risk for anal squamous intraepithelial lesion (SIL) and anal cancer is an integral part of routine screening colonoscopy. In order to reach the columnar epithelium at-risk for colorectal cancer, the colonoscope must traverse the perianal skin, the anal pecten and the anal transitional zone (ATZ). The anoderm infection (perianal skin, pecten, ATZ) is examined. The normal endoscopic appearance of anal cancer and its precursor, anal SIL has been described [1-4]. Anal SIL detected by biopsy of suspicious lesions can be ablated.

Methods

In 2011, approval was obtained from the Cleveland Clinic Institutional Review Board to identify and evaluate all patients within our Health System who had received the diagnosis of anal SIL. In this non-randomized prospective study, anal SIL was diagnosed incidentally at screening colonoscopy for colorectal cancer. Follow-up chromoendoscopy to detect and ablate anal SIL was performed as described previously using high definition gastroscopes (Olympus GHF 180/190) [5,6]. In the chromoendoscopic examination, the ATZ and anal pecten were inspected using EF and RF views with white light (WL) and NBI before and after treatment of the ATZ and anoderm with 3% acetic acid (AA). The anal canal was viewed with the endoscope EF with and without a self-lighted beveled Anospec™ anoscope. Features consistent with SIL were noted [7]. Photo-documentation was preserved as part of the permanent electronic medical record (ProvationTM, EPIC™). Histopathology was reported according to the Lower Anogenital Squamous Terminology (LAST) standardization project for HPV-associated lesions [8].

Results

Between 2011 and 2018, anal SIL was detected in 25 patients at screening colonoscopy for colorectal cancer. A review of the medical record did not reveal risk factors for anal cancer. Patient demographics are shown in Table 1. Ten patients were identified by the authors; 15 patients were referred to the authors for management of anal SIL detected by other endoscopists. Pathology of lesions biopsied at screening colonoscopy is shown in Table 2. All patients subsequently underwent chromoendoscopy with EF and RF views using NBI and AA under conscious sedation to reidentify, biopsy and ablate anal SIL; pathology of lesions biopsied and ablated are shown in Table 3.

On rebiopsy, the diagnosis changed from LSIL to HSIL in three patients and from HSIL to LSIL in one patient.

During routine colonoscopy, the epithelium at risk for anal HPV infection (perianal skin, pecten, ATZ) is examined. The normal endoscopic appearance of the ATZ and pecten, seen with RF and EF views, is shown in Figures 1a, b, c (Figure 1).

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Key words: Anal dysplasia, Squamous intraepithelial lesion, screening colonoscopy, human papillomavirus, chromoendoscopy, narrow band imaging

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Examples of anal SIL detected in patients included in this study are shown in Figure 2. Endoscopic features of anal SIL include acetowhite changes, punctuation and mosaicism. Lesions may be raised or flat [7].

**Discussion**

Anal squamous cell cancer (SCC) and its precursor lesion, anal SIL are HPV-related neoplasms [9-11]. The National Cancer Institute, Surveillance, Epidemiology, and End Results (SEERS) Program estimated 8,380 new cases of anal cancer in the United States in the year 2018 with rates for new anal cancer cases rising on average 2.2% each for the last 10 years [12]. The United States Department of Veterans Affairs recommends screening at-risk populations for anal cancer including HPV-infected men and women, particularly MSM (with or without HIV infection), any patient with a history of anogenital condyloma, and women with abnormal cervical or vulvar histology [13]. At risk populations not included in current screening recommendations include those with inflammatory bowel disease, collagen vascular disease and solid organ transplantation recipients as well as patients who have had exposure to HPV but who are asymptomatic [14].

According to the national Survey for Endoscopic Capacity about 15 million colonoscopies were done in the United States in 2012 for colorectal cancer screening [15]. Most teaching documents on the subject of colonoscopy focus on its role in the detection of adenomas to prevent colorectal cancer. Omitted is the role of colonoscopy in the detection of anal SIL and anal SCC despite the fact that examination of the epithelium at risk for anal SIL and anal cancer (the anal pecten and the ATZ) must be traversed in order to reach the columnar epithelium at risk for colorectal cancer.

**Anatomic considerations**

Nigro stated in 1987, that the ATZ is the site where anal cancer begins based on its cloacogenic origin, an origin that it shares with the cervical transformation zone [16]. In 1986, Fenger and Nielsen described three histologic zones of the anal canal, the colo-rectal mucosa, the ATZ above the dentate line and the squamous zone below [17]. In 1987, Fenger published an extensive description of the ATZ [18]. The proximal border of the anal transitional zone is the anorectal line described by Herrmann and Desfosses in 1880 [19]. Distal to the dentate line is the pecten, squamous epithelium, defined by Stroud in 1904 [20]. The anal verge is the junction of non-keratinized squamous epithelium of the anal canal with hair-bearing, keratinized, perianal skin [21].

External to the anal verge is the perianal skin or anal margin. In 2012, Tanaka et al. demonstrated the epithelial landmarks of the anoderm endoscopically (Figure 3) [22]. These anatomic landmarks are recognized easily by trained practitioners. Because of the anterior opening in the levator sling, the anterior ATZ usually is seen, especially during retroflexion with rectal insufflation. The posterior ATZ often is not seen on retroflexion because it lies distal to the anorectal ring.

**Table 1. Demographics.** 25 patients with anal SIL detected incidentally at routine screening colonoscopy.

<table>
<thead>
<tr>
<th>Female/male</th>
<th>16/9</th>
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<tr>
<td>Age Median</td>
<td>59 (range 46-82)</td>
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</table>

**Table 2. Anal SIL detected incidentally on colonoscopy in 25 patients**

<table>
<thead>
<tr>
<th>Pathology</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSIL</td>
<td>15</td>
</tr>
<tr>
<td>HSIL</td>
<td>10</td>
</tr>
</tbody>
</table>

**Table 3. Anal SIL identified, biopsied and ablated by chromoendoscopy with en face and retroflexed views in 25 patients**

<table>
<thead>
<tr>
<th>Pathology</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSIL</td>
<td>13</td>
</tr>
<tr>
<td>HSIL</td>
<td>12</td>
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defined by the puborectalis muscle. The pecten is seen on introduction and withdrawal of the endoscope. Colonoscopy, therefore, can detect neoplastic lesions of the epithelia at risk for both colorectal cancer and anal cancer in a single examination.

**Retroflexion**

Grobe evaluated retroflexion to look for 'rectal disease' as rectal retroflexion had not been studied as a diagnostic maneuver [23]. The procedure that we use to detect anal lesions for patients with risk factors can also be used to detect lesions during routine colonoscopy. It requires that retroflexion be done where safe and that the area be viewed in both white light and after using the narrow band imaging available with current high definition colonoscopes. The important point is to retroflex and then rotate as illustrated in Figure 4.

Water can be used to orient the lesions so that the same area can be viewed on future procedures. Water is always in the dependent position. In the anterior view the water would be on the right side of the photograph when the patient is lying on the left side.

In 1999, Dr. Jerome Waye, one of the pioneers in the field of endoscopy, in his article 'What constitutes a total colonoscopy?' wrote...

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**Figure 2.** a. Multiple ATZ lesions are partially seen on EF view with WL; b. (same patient as in Figure 2a) On anterior RF view with WL, multiple discrete lesions are seen. The ATZ and ARL are marked. Biopsy showed LSIL; c. This subtle slightly raised anterior ATZ lesion with punctuation (arrows) was seen on RF view with NBI. Pathology showed LSIL; d. RF view of a small lesion resembling an anal papilla under NBI illumination showed distinct vascular mosaicism. Biopsy showed LSIL; e. A bilobed raised lesion (arrows) with prominent vessels seen on RF view with WL. Biopsy showed HSIL; f. Retroflexed view of the ATZ with NBI, shows areas of punctuation (arrowheads). The colonoscope is seen at the top of the image (S). Biopsies showed HSIL; g. EF view of an anal canal lesion seen with NBI (arrows). Biopsies showed HSIL; h. A cluster of flat distal rectal lesions seen EF during WL colonoscopy; i. Repeat RF examination of the patient in Figure 2h with NBI and AA shows an acetowhite cluster of lesions on the left ATZ. Biopsy showed HSIL.

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**Figure 3.** Anatomic features of the anal canal epithelium. The colorectal columnar epithelium meets the proximal border of the ATZ at the anorectal line of Herrmann and Desfosses. The ATZ meets the pecten of Stroud at the dentate/pectinate line. Within the ATZ are the columns and sinuses of Morgagni beneath which lie hemorrhoidal vessels. The pecten meets the hair bearing perianal skin at the anal verge.
Inkster MD (2018) Anal dysplasia detection during routine screening colonoscopy

The authors acknowledge with gratitude our colleagues who referred their patients in whom anal SIL was detected incidentally to us for further characterization and lesion ablation by chromoendoscopy (NBIA).

Conclusions

Anal SIL can be detected by examination of the anoderm and ATZ during routine screening colonoscopy. Lesions detected can be better defined and ablated by chromoendoscopy using NBI and AA. Focused examination of the ATZ and anal canal and perianal skin during routine screening colonoscopy affords an opportunity to increase detection of anal SIL, the precursor to anal squamous cell carcinoma. Lesions detected can reproducibly be reidentified and ablated by chromoendoscopy with NBI and AA. In the words of Dr. Waye, ‘the more you look, the more you find’.

Acknowledgements

The authors acknowledge with gratitude our colleagues who referred their patients in whom anal SIL was detected incidentally to us for further characterization and lesion ablation by chromoendoscopy (NBIA).

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