Melanosis Coli
Prevalence, Distribution, and Histologic Features in 200 Consecutive Autopsies at Kuopio University Central Hospital

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The occurrence of large-bowel melanosis was evaluated by microscopy in 200 large bowels at autopsy. Melanin was seen as yellow-brown pigment in the macrophages of the lamina propria. The pigment stained with diastase-alkaline blue PAS, Fontana, and iron stains. One hundred nineteen of 200 (59.5 percent) bowels showed melanosis, which was equally common in both sexes. Usually more than one segment was involved (most commonly, four segments). Melanosis was common in the proximal part of the colon, but much rarer in distal parts (sigmoid and rectum). Affected segments were successive; negative segments between positive ones were exceptional. If the rectum was affected, all five proximal segments were affected in 11 of 12 cases. The intensity of melanosis was directly related to the number of segments involved. In the oral part of the colon, affected males had a higher intensity of melanosis than affected women, but about the same intensity in the sigmoid and rectum. The fraction of patients with melanosis increased with age. Of men and women in the age group of 20 to 54 years, 32 and 44 percent were affected, and above the age of 75 years, 76 and 67 percent, respectively. [Key words: Melanosis; Large bowel]

Material and Methods
This study was performed as part of a larger international venture sponsored by the World Health Organization. Studies linked with the same project have been published earlier from Scotland and Norway.1 Age distribution is shown in Table 1.

The material was collected during the years 1975 to 1977. Forty-nine percent of autopsies were performed within 48 hours after death, 22 percent within 48 to 72 hours, and 29 percent within 72 to 98 hours.

In these autopsies the large bowel was removed and the flexures were marked with safety pins. The bowel was washed with water and subperitoneal fat was removed. The length of various segments was measured, and mucosa was studied for adenomas and polypoid lesions. The bowel was fixed on a board with pins, and fixed in large vessels with buffered 10 percent formalin.

For microscopic study, six separate samples through the wall were taken from the rectum, sigmoid, descending colon, transverse colon, ascending colon, and cecum. The samples were taken near the transition between two segments, at the oral part of the segments. The samples (20 mm long, 3 mm wide) were cut longitudinally, and further fixed in 10 percent buffered formalin, embedded in paraffin, sectioned at 5 μm and stained with hematoxylin and eosin. The authors also stained samples with...
TABLE 1. Melanosis of the Large Bowel in 200 Autopsy Cases at Kuopio University Central Hospital, Finland, 1975-1977.

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>Men and Women</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Cases of Melanosis</td>
<td>Percent of Age Group</td>
</tr>
<tr>
<td>20 to 54</td>
<td>50</td>
<td>19</td>
<td>30</td>
</tr>
<tr>
<td>55 to 64</td>
<td>51</td>
<td>32</td>
<td>62.7</td>
</tr>
<tr>
<td>65 to 74</td>
<td>50</td>
<td>33</td>
<td>66</td>
</tr>
<tr>
<td>Over 75</td>
<td>49</td>
<td>35</td>
<td>71.4</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>119</td>
<td>59.5</td>
</tr>
</tbody>
</table>

Weigert's iron hematoxylin-van Gieson stain.

**Microscopy in Detecting Melanosis:** The presence of melanosis was investigated microscopically at X 40 objective magnification. There were six samples for each bowel, and the presence of melanosis was evaluated in 1200 samples (200 autopsy cases).

**Grading and Intensity of Melanosis:** Melanin pigmentation in tissue samples was graded into three categories. Mild melanosis (grade 1) corresponded to a few scattered melanin-positive macrophages in the lamina propria, usually near the surface of the mucosa. In heavy melanosis (grade 3) there was a large number of melanin-laden macrophages, usually in coherent cell groups. Macrophages were also seen deep in the lamina propria. Moderate melanosis (grade 2) signified intensity between mild and severe melanosis.

Intensity of melanosis in each bowel was calculated by summing up the grades of individual segments in each large bowel. The mean grade of melanosis was calculated by dividing the latter figure with the number of segments, i.e., with six. Maximum grade of melanosis in the segments which showed the highest intensity (range, 0 to 3). Melanosis intensity in segments in each material was calculated by summing up the grades of a specified segment (e.g., cecum) in the whole material. To estimate the mean intensity of melanosis in each segment the latter figures were divided by the number of affected segments or the total number of segments.

**Statistical Techniques:** The distribution of melanosis with respect to the intensity of melanosis in each bowel, the mean grade of melanosis, and the maximum grade of melanosis, was studied with the help of Pearson's r correlation coefficient.

**Results**

**Histologic Features:** Melanin in hematoxylin and eosin-stained sections was seen as yellow-brown pigment in macrophages of the lamina propria and could be further stained with diastase-alcian blue PAS, Fontana, and iron stains. The staining characteristics were tested in 25 large bowels during the earliest part of the study.

Slight or moderate autolysis helped in detection of melanosis because the background staining was faint and autolysis did not affect the color intensity of the pigment to the same degree. Cecal samples were exceptions because autolysis was advanced further in these samples than in samples taken from other segments of the large bowel. Cecal melanosis of slight intensity may have remained undetected in autolytic samples, but not intense or moderate melanosis.

More than half the cases (119 to 200) showed melanosis (Table 1). There was no significant difference between sexes. Table 1 also shows that the prevalence of melanosis increased with age.

**Distribution:** More than one segment usually was involved (average four). Most often melanosis was found in the ascending colon (98 cases), transverse colon (106 cases), or descending colon (90 cases). Melanosis was not unusual in the cecum (75 cases), but the sigmoid colon and rectum were rarely affected (35 and 12 cases, respectively). There were 64 possible combinations of positive segments, but only 18 of these were seen in this study. In 69 cases, melanosis was seen in the cecum, ascending, or transverse colon, extending in 58 of these to more distal parts of the colon. The most common type of distribution ranged from the cecum to the descending colon. There were also cases with affected middle segments; the range usually was over several segments, rarely was only one segment involved. Among cases affecting the middle segments there were cases of melanosis extending to the rectum. The middle segments showed melanosis more often than the cecum. There were also rare combinations. Any segment could be involved, and there were also cases with one affected segment or cases with "clean" segments between affected segments (Table 2). The sigmoid colon and rectum were never affected alone. Melanosis in the latter segments was seen only in cases with intense melanosis in the more oral parts of the bowel. If the rectum was affected, all five proximal segments were affected in 11 of 12 cases.

**Intensity of Melanosis:** The melanosis score reflected the total amount of pigmentation in the bowel. The melanosis score, as such, had a good correlation with the