Pathology of Colonic Polyps as It Relates to Surgical Management

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ABSTRACT

A large variety of polypoid tumors of the colon exist. Regardless of the type, those under one cm may be treated conservatively. Of the adenomatous polyps, the large sessile adenoma, villous or otherwise, is best handled by segmental resection or by complete excision followed later by radical surgery if indicated by further pathologic examination. The presence of a pedicle is no guarantee of the absence of carcinoma. Although cases of metastases have been reported with carcinoma confined to the head of stalk polyp, nonetheless, this is sufficiently rare so that conservative surgery is quite adequate if the base is clear. This holds also for stalked polyps that appear to be entirely carcinomatous.

Lymph node metastases have been confined, in the author's experience, to those adenomas containing sizable areas of carcinoma and which show invasion at least to the depth of the muscle coat. Lymph node metastases from pure carcinomas have not been seen except for those in which invasion has occurred to at least the level of the muscle coat. Mixed villous and adenomatous polyps are very common and most polyps larger than 1.5 cm are usually of the mixed type. There appears to be a correlation between the presence of both in situ and invasive carcinoma with villoglandular elements. Although carcinoma may be found in pure adenomas, it is extremely uncommon. In a series of 174 pure adenomas, 7 percent contained in situ carcinoma and only one case (0.6 percent) contained an invasive carcinoma. In 80 mixed villous and glandular adenomas, 18.7 percent contained in situ carcinoma and three cases (3.75 percent) contained an invasive carcinoma.

Biopsies of polypoid lesions of the colon are preferably excisional. Polyps of estimated size of 1 cm or less can probably be safely followed rather than excised in the patient in which the excision is difficult. They should not be ignored as growth and subsequent carcinoma may occur. Quite aside from whatever threat a carcinoma in a polyp carries for the patient in and of itself, such cases indicate a high risk population in which approximately 20 percent of the patients will have, either at the same time or later, a frank carcinoma somewhere in the colon. Thus, all such patients should have very careful, thorough colonic examinations and be followed at close intervals.
Introduction

The term colonic polyp is applied to lesions ranging from mere lymphoid reactive states to polypoid carcinoma. The clinician is faced with a polypoid lesion, not a histologic preparation. It is obvious that the initial and, as it often turns out, the only step necessary is biopsy, preferably excisional. Tragic cases have been reported of needless colectomies in children with lymphoid polyposis, a self-limiting condition. Similarly, the presence of lymphoid polyps in the terminal ileum in patients with familial adenomatous polyposis of the colon has led to needless resection of various lengths of that organ, a procedure avoidable by frozen section. Needless partial colectomies for lipomas of the cecum and ascending colon are not uncommon. Accurate histologic identification is necessary for all polyps with possible exceptions which will be discussed.

This presentation will be confined chiefly to adenomas. However, some information is necessary about the so-called hyperplastic or metaplastic polyp. These distinctive polyps probably form the majority of polypoid lesions under 3 mm in size in the colon. Despite this frequency, it is only in very recent years that polypoid lesions have been separated from true adenomas; they account for great confusion in the literature concerning the incidence of adenomas. Occasionally, hyperplastic areas may be found within an adenoma or within a villous adenoma, although usually they are independent. While it has been suggested that they act as predecessor elements of adenomas, the evidence does not seem to be convincing. The hyperplastic ones are rarely over one cm, are almost always sessile and are of the same color as the surrounding mucosa. Once recognized, they may be safely ignored.

Most discussion centers around the adenomatous polyp and the less common villous or papillary adenoma. Studies on cell kinetics by Cole and others show that the normal colonic mucosa has an extremely rapid and complete turnover time of approximately three days. New cells are formed by division in the crypts which differentiate and are carried or pushed to the surface and desquamated. Adenomas are the result when something goes wrong with this division-maturation-desquamation sequence with mitoses no longer being confined to the base of the crypts. Whether or not an adenoma grows, remains static or disappears (all of which have been observed clinically) logically depends on the equilibrium between division and desquamation in these short-lived cell lines. Within some adenomas, abnormal cell lines (histologically and cytologically looking like carcinoma) are not infrequent. A closer look should be taken at the type of adenoma apt to have such abnormal cell lines and its relation to what should be done for them.

First, briefly consider the large, sessile villous adenoma. It is generally agreed that half, or nearly so, will be found to contain areas of invasive carcinoma. Biopsy of these tumors is notoriously unreliable, especially in the direction of missing carcinoma that is present. This probably occurs because such areas tend to be held away from the biopsy instrument by the desmoplastic reaction of invasion which permits the benign areas to prolapse. In addition, areas of in situ carcinoma are apt to be overinterpreted as frank cancer if the biopsy happens to include only such areas. Still, further confusion arises from biopsy of villous areas in otherwise adenomatous polyps. A reasonable surgical policy is for resection where this can be done. In the rather common situation where tumors occur in the rectum or rectosigmoid, a total mucosal excision may be performed, reserving a cancer type of operation for those cases in which, after such excision, invasive carcinoma is found to be present.
Adenomatous Polyp

_In situ_ carcinoma may be defined as any area in an adenoma in which loss of polarity, stratification, nuclear pleomorphism and disorder or loss of glandular pattern are present, but in which there is no evidence of stromal invasion. Invasive carcinoma may be defined as areas in an adenoma showing changes similar to those mentioned under _in situ_ carcinoma, but which, in addition, show a desmoplastic reaction or clear-cut invasion beyond the muscularis mucosa, or both. Many workers recognize invasion only when the tumor extends through the muscularis mucosa. This is perhaps valid, but it is subject to difficulties in that the muscularis mucosa is sprayed out and hypertrophied, especially in stalked adenomas. Its extent may be ill defined. Some carcinomas will show, both by evidence of a desmoplastic reaction and by the presence of single cells or cell clusters, that they have reached an invasive stage and yet are not clearly beyond the smooth muscle tangle of the altered muscularis mucosa.

Pseudoinvasion

In 1962, Castleman_4_ pointed out the fallacy of giving the name “invasion” to those adenomas which, by plane of section, appeared to contain areas of epithelium within the stalk or within the stroma of the head. This is not a difficult problem if one observes the rule that, in such cases, the contained epithelium will lack a desmoplastic reaction and will be identical in structure to the surface epithelium. The situation illustrated by Fechner_7_ is a more difficult one. Certain adenomas will contain pools of mucin within the submucosa with a mucus secreting epithelial component more closely resembling colonic mucosa rather than adenomatous or carcinomatous epithelium. This may be secondary to trauma, ulceration, or infection; evidence of old hemorrhage is not infrequent. Occasionally, a mucous cyst lined with adenomatous epithelium may also rupture within the submucosa. One should be careful not to consider this evidence of stalk involvement. On the other hand, mucinous carcinomas may arise in adenomas, and one must pay close attention to the cytology of the entrapped elements.

Age Factors

There appears to be no simple chronologic relationship (table I) as far as age is concerned between those with non-invasive and invasive carcinoma and the age of those without carcinoma has been reported variably younger and at about the same age._6_ While this is of theoretic interest, of more practical importance is that only two cases with invasive carcinoma out of a series of 55 were under 40 years of age. One of the two had familial polyposis; the other had ulcerative colitis. Aside from these special cases, only two others were less than 50 years of age. The patient below the age of 45 is certainly not an object of concern to any screening efforts made to disclose early carcinomas.

The direct correlation of size and the presence or absence of carcinoma has been abundantly documented in the literature. It is shown in table II that those with
invasive carcinoma form the largest group, those with *in situ* form an intermediate group and those without, form a much smaller group. Twenty-three percent of the adenomas with *in situ* carcinoma were one cm or less in size. On the other hand, only one, in this particular series of adenomas containing invasive carcinoma, were in this range. The statement is often made that a polyp of one cm or less in size may be followed safely rather than excised. This rule seems to hold in the author's experience insofar as invasive cancer is concerned. What the fate of the relatively more frequent group of adenomas with *in situ* changes would have been if they had not been excised is a moot point. It is presumed that appreciable growth would occur prior to the development of invasive carcinoma. It may be pointed out that metastasis is also exceedingly rare in carcinoids under one cm in size.\(^1\) Therefore, the same rule of conservative management holds. Only one polypoid carcinoma under one cm has been encountered by the author. It is the author's belief that all polyps should be removed if possible. Certainly, the polyp under one cm, if access is difficult and if it is in a high risk patient, may be followed safely, but it may not be ignored.

### TABLE II

**DIRECT CORRELATION OF SIZE AND PRESENCE OR ABSENCE OF CARCINOMA**

<table>
<thead>
<tr>
<th></th>
<th>Average No.</th>
<th>Average Size mm</th>
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<tbody>
<tr>
<td>Adenoma</td>
<td>223</td>
<td>9.9</td>
</tr>
<tr>
<td>Adenoma with <em>in situ</em> carcinoma</td>
<td>77</td>
<td>20.0</td>
</tr>
<tr>
<td>Adenoma with invasive carcinoma</td>
<td>51</td>
<td>28.0</td>
</tr>
</tbody>
</table>

The validity of sharply separating villous adenomas from polypoid adenomas has been brought into question in recent years. In an earlier study, it was found that 10 percent of the villous adenomas had a stalk. A number of authors have pointed out that villous areas are very common in adenomatous polyps and that the incidence of their presence correlates with the size of the tumor and probably with an increased incidence of carcinoma.\(^1\)\(^8\) In a series of 254 consecutive adenomas (table III), 174 of them were found to be without villous features. In this group, 12 (7 percent) showed *in situ* carcinoma and only one case (0.6 percent) showed invasive carcinoma. Of the remaining 80 adenomas, with villous areas, 15 (18.7 percent) contained *in situ* carcinoma and 3 (3.75 percent) contained invasive carcinoma.

Similarly, in a series of 55 adenomas containing areas of invasive carcinoma, only five of the 55 were without villous features. Whether or not the increased potential for carcinoma rests in the villous elements, in mere size or in other factors is not clear.

### TABLE III

**CONCEPT OF MIXED ADENOMATOUS AND VILLOUS FORMS**

<table>
<thead>
<tr>
<th>Carcinoma</th>
<th>In Situ</th>
<th>Invasive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adenoma Total</td>
<td>254</td>
<td>27</td>
</tr>
<tr>
<td>Without villous areas</td>
<td>174</td>
<td>12</td>
</tr>
<tr>
<td>With villous areas</td>
<td>80</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>254</td>
<td>27</td>
</tr>
</tbody>
</table>
The mixed villous and adenomatous polyps average four years older than the “pure” glandular adenomas. From the size point of view, 80 percent of the pure glandular adenomas were one cm or less in size; only 1.2 percent of them was larger than two cm. This compares with 28.7 percent of the mixed forms being more than two cm in size.

In table IV is shown the distribution from one to 30 mm size range. In the 5 to 15 mm range, where comparable numbers exist, there seems to be little difference in the incidence of in situ carcinoma.

**Presence or Absence of Stalk**

The presence of a stalk, particularly if elongated and flexible, is considered to be good evidence of a lack of carcinoma. Strictly speaking, this is not true. Indeed, in the author’s experience, more invasive carcinomas were found in adenomas with stalks than in those that were sessile, although in most of these the stalk itself was not involved. In those where the carcinoma was dominant (that is forming a major fraction of the adenoma), they were equally divided with six being present in stalked adenomas and six in sessile. Where the stalk is extensively involved, it is usually a thickened and short stalk rather than a long and flexible one.

The occurrence of metastasis has been reported in at least five cases of stalked adenomas where the carcinoma has not invaded the base.\(^a\) In this series of 55 adenomas with invasive carcinoma, lymph node metastasis was present in six. In each of these, the carcinoma was dominant and also had invaded below the level of normal mucosa, involving the muscle coat in two cases and the serosa in four cases. From the practical point of view, the clinical rule stating that if the base of the stalk is free, a polyp may be treated safely by simple excision or snaring, seems still to be valid, despite rare reported exceptions.

In the case of large sessile polyps over two cm in diameter, segmental resection seems desirable since depth of invasion of carcinoma, if present, is difficult or impossible to determine from biopsy or frozen section owing to sampling problems. Such resection is also probably the safest treatment for the broad, short-stalked adenoma with evidence of invasion to the base. If rectal, one might compromise and use the same procedures as those for villous adenoma.

**Biopsy**

As previously stated, biopsy, while very important, has some limitations. Incisional biopsies may not pick up areas of carcinoma; contrariwise, an area of in situ carcinoma in a large adenoma, if preferentially biopsied, may lead to unnecessary surgery on the assumption that one is dealing with a large adenocarcinoma. Certainly if one is dealing with a large polyp and a small biopsy, the pathologist should be informed that this is the situation.

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\(^a\) Metastases in this situation has not been observed by us.

**TABLE IV**

| Size Distribution in Relation to Incidence of In Situ Carcinoma |
|-----------------------|------------------|------------------|
| **Adenoma With** | **Villous Features** |
| **In Situ In Situ** | **Carcinoma Carcinoma** |
| **Size** | **Total** | **%** | **Total** | **%** |
| mm | Carcinoma | | Carcinoma | |
| 1-4 | 70 | 0 | 0 | 1 | 0 | 0 |
| 5-9 | 69 | 5 | 7.2 | 22 | 1 | 4.6 |
| 10-14 | 19 | 4 | 21 | 18 | 4 | 22 |
| 15-20 | 14 | 2 | 14.3 | 16 | 4 | 25 |
| 21-31 | 1 | 0 | 0 | 17 | 4 | 23 |

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Associated Carcinoma

The diagnosis of an adenoma, villous or otherwise, that contains an area of \textit{in situ} or invasive carcinoma, quite aside from whatever threat it may in itself carry, even more importantly indicates that one is dealing with a patient at high risk of frank cancer of the colon. From 12 to 20 percent of such patients will have a metachronous or synchronous carcinoma elsewhere in the colon. Nearly half of the cases will have other adenomas.

Summary

A large variety of polypoid tumors of the colon exist. Regardless of the type, those under one cm may be treated conservatively. In the adenomatous group, the large sessile adenoma, villous or otherwise, is best handled by segmental resection or by complete excision followed by later radical surgery if indicated by further pathologic examination. The presence of a pedicle is no guarantee of the absence of cancer; however, if the base is clear, conservative surgery is quite adequate. Lymph node metastases, in the author's experience, have been confined to those adenomas containing sizable areas of carcinoma and showing invasion at least to the depth of the muscle coat. Biopsies of polypoid lesions of the colon are preferably excisional. Polyps which are situated in places where access is difficult, and particularly in high risk patients, under the size of one cm, can probably be followed safely, although they should not be ignored.

References