# Colonoscopy and the Management of Polyps Containing Invasive Carcinoma

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**Experiences with 565 colonoscopic polypectomies and 91 colonic and rectal resections containing infiltrating carcinoma in polyps are reviewed. A plan of management based on pathologic study of resected polyps is formulated to avoid further unnecessary surgery. It was concluded that: (1) Tubular adenomas containing invasive carcinomas have a low incidence of metastatic node involvement. This incidence is related to the depth of carcinomatous involvement. Resection of these polyps with a margin free of carcinoma constitutes definitive and adequate treatment, and that (2) Villous adenomas containing invasive carcinoma have a high incidence of metastatic nodal involvement, and operative resection of the involved area of the colon is recommended, and that (3) Pedunculated tubulovillous adenomas containing invasive carcinoma behave like tubular adenomas, and the recommendations for further surgery in the patient with tubular adenomas with carcinoma apply equally well for these lesions. Sessile tubulovillous polyps tend to behave like villous adenomas, and if invasive carcinoma is demonstrated, further operation is recommended.**

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COLONOSCOPIC POLYPECTOMY has become the accepted treatment for most polyps of the large bowel. The management of colonic polyps which contain invasive carcinoma still remains a controversial subject.[1,3,6,10,15,17,18] It is the purpose of this paper to propose a plan of management in these cases based on microscopic characteristics so that unnecessary surgery will be avoided.

## Materials and Methods

Five hundred sixty-five colonoscopic polypectomies were performed in 435 patients over a period of 45 months. Various instruments were used for this purpose, the most recent being the Olympus CFLB-2 and TCF-2. Polyps were excised by use of electrosurgical snare technique, and were recovered for microscopic examination in 477 of 565 instances. In 80 instances the polyps were small (less that 4 mm in diameter) and appeared benign; these were destroyed with electrocoagulating current. They are not included in the total polypectomy count above, and are excluded from further discussion.

The pathologic classification of the excised polyps is shown in Table 1. Seventeen polyps (13 tubular adenomas and four tubulovillous adenomas) reported to contain invasive cancer were resectioned and restudied by one of us (S.B.); the results of this are given in Table 2. The following pathologic findings were noted: type of polyp, presence or absence of carcinoma invading through the muscularis mucosa into the substance of the polyp (defined as invasive malignancy when present), and depth of invasion into the stalk. Depth of invasion of the muscularis propria of the bowel wall, and presence or absence of carcinoma within the lymph nodes were noted in those cases in which operation was also performed.

Because the number of patients having polyps with invasive carcinoma in this colonoscopy series was small, and because all patients in the series did not undergo operation, we expanded our data by including polyps which were resected at operation prior to the availability of colonoscopic polypectomy. This material included specimens of resected colons and rectums that contained polyps with invasive malignancy, and it is derived from data that constitutes a larger review of surgically resected polyps to be published. The resected specimens selected from 91 patients contained lesions less than 5 cm in diameter, since such lesions would be amenable to colonoscopic polypectomy.[20] The specimens were resectioned and studied by one of us (S.B.), and the criteria outlined above were again utilized for pathologic classification. In addition, the depth of invasion of the carcinoma into the polyp stalk was determined and defined as invasion of the upper, mid-

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TABLE 1. *Colonoscopic Polypectomy*

| Pathologic Classification | Number of Polyps |
|---|---|
| Tubular adenoma | |
| Benign | 299 |
| With dysplastic focus | 34 |
| With superficial carcinoma | 24 |
| With invasive carcinoma | 13 |
| Tubulovillous adenoma | |
| Benign | 25 |
| With invasive carcinoma | 4 |
| Villous adenoma | |
| Benign | 13 |
| With superficial carcinoma | 3 |
| With invasive carcinoma | 1 |
| Juvenile | 4 |
| Lipoma | 2 |
| Hamartoma | 6 |
| Hyperplastic or inflammatory | 49 |
| Not retrieved | 88 |
| Total polyps removed | 565 |
| Total polyps recovered | 477 |

dle, or lower third of the stalk. The pathologic criteria for invasive carcinoma in 17 tubular adenomas, 22 tubulovillous adenomas, and 52 adenomas is given in Tables 3–5 respectively.

## Results

The incidence of polyps containing invasive carcinoma in the colonoscopy series was 5.6% for tubular adenomas, 16% for tubulovillous adenomas, and 41% for villous adenomas.

Thirteen patients had tubular adenomas containing invasive carcinoma removed by colonoscopic polypectomy. Six of these patients underwent operation shortly after colonoscopy because a question of residual carcinoma was raised in each case. In three of these, no residual tumor was found (patients 2–4); in the other three patients, residual carcinoma was found at the polypectomy site (patients 1, 5, and 6). Two of the six pericolonic lymph nodes removed from one of these three patients contained carcinoma. The lesion in this patient (patient 6) was relatively small and confined to the bowel wall with apparent invasion of only the superficial muscularis propria, but there was definite secondary neoplasm in two pericolonic lymph nodes.

Follow-up information was obtained from five patients who had tubular adenomas containing invasive carcinoma but did not undergo operation. In one of these patients (patient 8), a carcinoma subsequently developed two years after polypectomy, the polyp being located in the sigmoid colon. The cancer occurred at a site distant from that of the polypectomy. Four years after polypectomy, carcinoma in the sigmoid colon developed in this same patient. Two other patients in this group were actively followed, including colonoscopy at one and three years respectively, with no evidence of malignancy. A fourth patient in this group has been actively followed for two and one-half years and is asymptomatic, but has not had colonoscopy. A fifth patient has not been actively followed, but when contacted, he stated that he felt well and was asymptomatic for any signs of malignancy three years after the polypectomy. Two patients were lost to follow-up (patients 12 and 13).

Four patients had tubulovillous adenomas containing invasive carcinoma removed at the time of colonoscopy. Two of these underwent operation for this reason, and in one residual tumor was found at the site of polypectomy (patients 14 and 15). The other two patients in this group have been actively followed for four months

TABLE 2. *Colonoscopic Polypectomy Polyps with Invasive Carcinoma*

| Patient No. | Pathologic Type | Polyp Diameter | Location | Other Polyps Present | Stalk Invasion |
|---|---|---|---|---|---|
| 1. | Tubular adenoma | 1.3 cm | Sigmoid | No | Yes |
| 2. | Tubular adenoma | 1.2 cm | Sigmoid | No | Yes |
| 3. | Tubular adenoma | 1.5 cm | Sigmoid | No | Yes |
| 4. | Tubular adenoma | 0.7 cm | Descending colon | 3 | No |
| 5. | Tubular adenoma | 1.0 cm | Sigmoid | No | Yes |
| 6. | Tubular adenoma | 1.1 cm | Sigmoid | 4 | Yes |
| 7. | Tubular adenoma | 1.0 cm | Sigmoid | 3 | Yes |
| 8. | Tubular adenoma | 1.3 cm | Sigmoid | 4 | Yes |
| 9. | Tubular adenoma | 2.7 cm | Sigmoid | No | ? |
| 10. | Tubular adenoma | 2.0 cm | Descending colon | 3 | Yes |
| 11. | Tubular adenoma | 1.5 cm | Sigmoid | 3 | No |
| 12. | Tubular adenoma | 1.5 cm | Sigmoid | 1 | No |
| 13. | Tubular adenoma | 1.0 cm | Sigmoid | No | Yes |
| 14. | Tubulovillous adenoma | 3.0 cm | Hepatic flexure | No | Yes |
| 15. | Tubulovillous adenoma | 1.5 cm | Sigmoid | 1 | No |
| 16. | Tubulovillous adenoma | 1.5 cm | Rectum | 2 | Yes |
| 17. | Tubulovillous adenoma | 1.5 cm | Sigmoid | 2 | Yes |

Polyp diameter = average of 3 dimensions. ? = uncertain.

TABLE 3. *Pathologic Criteria in 17 Resected Specimens Containing Tubular Adenomas with Invasive Carcinoma*

| Carcinomatous Involvement | No. Specimens | No. Containing Positive Lymph Nodes |
|---|---|---|
| Confined to head | 1 | 0 |
| Upper third stalk | 4 | 0 |
| Middle third stalk | 1 | 0 |
| Lower third/base stalk | 5 | 0 |
| Inner half muscularis propria | 1 | 0 |
| Outer half muscularis propria | 1 | 0 |
| Extension beyond serosa | 4 | 1* |
| Total | 17 | 1 |

* This lesion was a carcinoma extensively replacing a tubular adenoma.

and four years respectively, and no evidence of carcinoma has been found.

In only one of the 17 patients with tubular adenomas from the surgically resected group (Tables 3–5) was there metastatic node involvement, and in this patient, the carcinomatous changes extended well beyond the serosa and the bulk of the polyp was replaced by tumor. Ten of the tubulovillous polyps were pedunculated and in none of these was there metastatic node involvement. In sessile lesions of the tubulovillous type, lymph node involvement with carcinoma was present in four of 12 patients. For villous adenomas (Table 5), size was not predictive of the presence or absence of lymph node involvement. Lesions containing only microfoci of invasion were not associated with lymph node metastasis. Once the invasion progressed beyond the submucosa, the incidence of metastatic node involvement increased.

## Discussion

The overall incidence of invasive malignancy for tubular adenomas is reported to be about 4%.[1,3,5–8,10–12,17,18] Recommendations for management of these polyps vary widely. Welch et al.[18] advocate radical excision in every case of polyp; other authors, such as Turnbull et al.[17] propose more conservative treatment. Many authors favor radical operation in cases of invasive malignancy without reference to the depth of carcinomatous invasion.[1,3,10,11,12,18] Others advise radical resection if the lesion is highly undifferentiated or the carcinoma extends to the base of the stalk.[8,14,20]

Following colonoscopic polypectomy, Berci and Morgenstern[4] found no residual tumor in four patients with invasive malignancy in a polyp who subsequently had surgical resections. Wolff and Shinya[20] had 11 patients in whom subsequent colonic resection was undertaken. In three of these, polypectomy was incomplete and residual carcinoma was noted at the time of operation. In the other eight, no residual tumor was found. They recommended subsequent colectomy on the basis of this experience, only if the polypectomy is incomplete or if the plane or resection approximates an area of carcinoma.

Since there is an increasing number of colonoscopic polypectomies being performed, it becomes vitally important to establish criteria for those lesions which will require surgery. On the basis of our experience with colonoscopy and the results of pathologic study of resected colonic specimens containing polyps with invasive malignancy, the following plan is recommended where invasive malignancy is found in colonoscopically resected polyps.

From our data and that of others,[4,10,14,20] it would appear that tubular adenomas containing invasive carcinoma confined to the head of the polyp or upper part of the stalk rarely have nodal involvement. Thus, if the tubular adenoma containing malignant cells can be totally excised without cutting through a carcinomatous portion of the tumor, adequate and definitive treatment has been achieved. This applies to the stalk as well as the head of the polyp. If the margin of resection is through a carcinomatous portion of the tumor (stalk or head), then further surgical treatment is recommended because of the indeterminate actual level of invasion of the malignancy and the possibility of residual carcinoma. It would also seem logical to recommend that operative treatment be considered if angioinvasion or

TABLE 4. *Pathologic Criteria in 22 Resected Specimens Containing Tubulovillous Adenomas with Invasive Carcinoma*

| Carcinomatous Involvement | No. Specimens | No. Containing Positive Lymph Nodes |
|---|---|---|
| Confined to head | 3 | 0 |
| Involvement upper third stalk | 2 | 0 |
| Involvement mid-third stalk | 3 | 0 |
| Involvement lower third stalk | 5 | 0 |
| Involvement inner half musc. propria | 3 | 1 |
| Extension beyond serosa | 6 | 3 |
| Total | 22 | 4 |

TABLE 5. *Pathologic Criteria in 52 Resected Specimens Containing Villous Adenomas with Invasive Carcinoma*

| Carcinomatous Involvement | No. Specimens | No. Containing Positive Lymph Nodes |
|---|---|---|
| Microfocus | 1 | 0 |
| Extension into submucosa | 12 | 1 |
| Extension inner half musc. propria | 10 | 2 |
| Extension outer half musc. propria | 18 | 3 |
| Extension beyond serosa | 11 | 7 |
| Total | 52 | 13 |

lymphatic permeation is observed or also if the lesion is highly undifferentiated. Our data are too limited on these points to make firm conclusions.

The incidence of invasive malignancy in villous adenomas is approximately 30%.[8,9–10,13,18–20] Carcinomatous lymphatic involvement occurred in approximately 25% of our cases in the surgical series. This incidence increases as the tumor extends toward the serosa (Table 5). In view of the high incidence of lymphatic involvement with villous adenomas containing carcinoma, the presence of invasive malignancy should constitute an absolute indication for radical operation, unless the patient's general status contraindicates this. This plan is generally recommended by most authors.[2,3,9,13,16,18,19]

The information available regarding tubulovillous adenomas is inadequate. According to Wolff and Shinya[20] and Behringer,[3] the malignant potential of this lesion is intermediate between tubular and purely villous adenomas. In our series, it appears that the presence or absence of a stalk considerably influences the potential for deep penetration of carcinoma in these lesions. Although the number of such polyps in our series is small, it appears that pedunculated tubulovillous adenomas can be treated as tubular adenomas, and that sessile ones should be regarded as villous adenomas in terms of recommendations for surgery. Therefore, if such a lesion is pedunculated, and the margin of resection through the stalk is free of carcinoma, then the treatment has been adequate. If, however, the lesion is sessile and contains invasive malignancy, then operative resection is recommended.

Microscopic appearance thus plays a crucial role in the further management of tubular adenomas, tubulovillous adenomas, and villous tumors resected at colonoscopy. An attempt to excise the lesion in toto should be made and the recovered specimen should have accurate microscopic appraisal as outlined. Once microscopic evaluation is available, a plan of management following the above outlined recommendations will aid in avoiding unnecessary operations in cases of tubular adenomas or pedunculated tubulovillous adenomas. These represent lesions of very low malignant potential. The presence of lymphatic or vascular permeation and/or the presence of a highly undifferentiated lesion probably also constitute indications for resection. It must be mentioned that metastatic lymph node involvement can occur in the presence of focally invasive carcinoma. This is a very rare circumstance and less than 30 such cases have been reported.[14]

In dealing with sessile tubulovillous lesions or villous adenomas containing invasive malignancy, our data and that of others support the view that further surgery is indicated because of the high incidence of metastatic lymph node involvement.

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