Colonic Conditions: Adenomatous Polyps

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Refer to Algorithm in Fig. 63.1

A. The association between colorectal adenomatous polyps and colorectal cancers (CRC) was first described by Lockhart-Mummery and Dukes in 1927. This association set the stage for the later recognition that adenomatous tissue is a precursor to the development of CRC. The "adenoma to carcinoma" sequence was further elucidated by the identification of somatic mutations associated with this progression by Vogelstein et al. in 1988. These authors analyzed both colorectal adenomas of varying size and carcinomas for somatic mutations in known colorectal cancer-associated genes. Mutations in *ras* genes were more commonly identified in large adenomas and cancers as compared to smaller adenomas. In advanced adenomas and carcinomas, as compared to smaller adenomas, chromosomal sequences were also lost in chromosomal regions associated with cancer. These results helped to solidify our understanding of the step-wise development of colorectal cancer, involving both oncogene activation and loss of tumor suppressor gene activity.

B. The National Polyp Study, published in 1993, provided further evidence for the progression of adenomatous polyps to colorectal cancer. In this study, patients who underwent screening colonoscopy and polypectomy of histologically proven adenomatous polyps were compared to reference groups of patients for whom adenomatous polyps were not removed. The authors found that patients who underwent polypectomy had a lower-than-expected incidence of colorectal cancer when compared to the reference groups. This study underscored the importance of screening colonoscopy for the prevention of colorectal cancer.

C. Guidelines which suggest a colonoscopy screening algorithm are published by the National Comprehensive Cancer Network (NCCN), last updated in 2016. Initial screening for average risk individuals (no prior history of adenomatous polyp or colorectal cancer, no family history of colorectal cancer and no personal history of inflammatory bowel disease) should start at 50 years of age. Individuals with any of the above conditions should be screened based on NCCN guideline suggestions. Special consideration

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S. R. Steele et al. (eds.), *Clinical Decision Making in Colorectal Surgery*,
https://doi.org/10.1007/978-3-319-65942-8_63

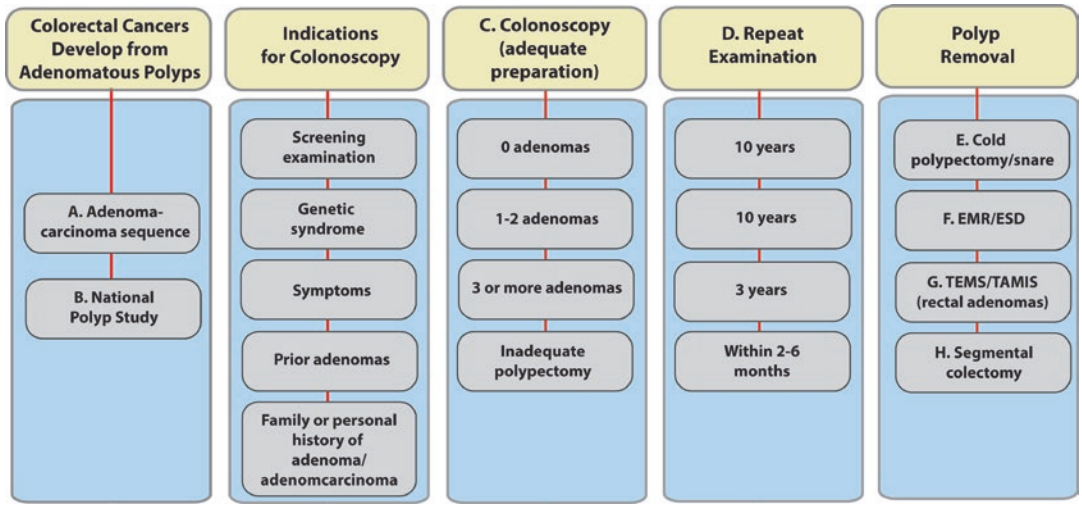

Fig. 63.1 Algorithm for colonic adenomatous polyps

should be given to individuals in whom a high-risk colorectal cancer syndrome may exist. These categories include Lynch Syndrome, Hereditary Nonpolyposis Colorectal Cancer (HNPCC), classical or attenuated Familial Adenomatous Polyposis syndrome (FAP or aFAP), MUTYH-associated polyposis (MAP), Peutz-Jeghers syndrome, Juvenile polyposis syndrome, Serrated polyposis syndrome, Cowden syndrome or Li-Fraumeni syndrome, who should be screened earlier. If an adenomatous polyp is found, complete removal should be performed. Intervals for repeat screening examinations depend on the presence and number of adenomatous polyps found on the index colonoscopy, polyp size and the presence of advanced adenomas (high-grade dysplasia, sessile serrated histology, villous or tubulovillous histology).

If no adenomatous polyps are found at the index colonoscopy, repeat examination is recommended in 10 years. Presence of 2 or fewer low-risk adenomatous polyps should prompt repeat examination in 5–10 years. Three or more adenomatous polyps, or presence of advanced adenomas, should prompt a repeat examination in 3 years. Incomplete or piecemeal polypectomy should prompt repeat examination within 6 months.

Patients with inflammatory bowel disease are recommended screening colonoscopy 8–10 years after the onset of symptoms. Ongoing surveillance depends on disease activity in addition to endoscopic findings. Individuals with a first degree relative with a colorectal cancer diagnosed at less than age 60 years should have their index examination at age 40, or 10 years earlier than the age of earliest CRC diagnosis in that first-degree relative. Individuals with a first-degree relative with an advanced adenoma should have their first colonoscopy at either age 50 or at the age of the family member with the advanced adenoma, whichever is earlier.

D. Even after appropriately timed screening colonoscopy, interval adenocarcinomas can occur in approximately 10.5% of patients. The majority of these interval lesions occur in the right colon. Theories as to the cause of this phenomenon include a worse bowel preparation in the right colon, biological differences in tumors of the right colon or an

increased proportion of flat lesions in the right colon that may have been missed at screening colonoscopy. Meticulous inspection behind mucosal folds and behind the ileocecal valve may help improve lesion detection.

E. During colonoscopy, polypectomy of small lesions (less than 3 mm in diameter) can usually be achieved by use of a cold biopsy forceps. The instrument is passed through the working channel of the colonoscope and the lesion excised, either in its entirety with one pass or in "piecemeal" fashion. For this purpose, the authors prefer using a "jumbo" size forceps, as the jaws can accommodate more tissue and help ensure a complete polypectomy. For larger polyps, biopsy forceps may not allow for complete polypectomy. In this situation, snare polypectomy may be necessary to ensure complete polyp excision. This device is similarly passed via the working channel of the endoscope. The snare is opened and secured around the base of the polyp. Complete closure of the device amputates the lesion. Once complete, the polyp can be grasped and withdrawn by aide of a through-the-scope net or suctioned through the colonoscope and captured in a specimen trap. Submucosal injection can also be utilized to aide in excision of the polyp. An injectate such as normal saline, glycerol, or hyaluronic acid is injected in the submucosal plane beneath and around the polyp, "lifting" the lesion off the muscularis propria. This can allow a snare to be deployed around the lesion, and may also minimize the possibility of transmural injury to the bowel, particularly if cautery is used. There is no consensus as to which injectate provides the best results. Polyps that do not lift appropriately during injection may indicate an invasive lesion, and complete polypectomy may not be possible. Prior attempts at polypectomy may also cause scarring within the lesion, precluding adequate lifting. For snare polypectomy, it is often helpful to position the lesion at the "5 o'clock" position on the screen, as this is where the working channel port is. This should allow proper positioning of the snare.

F. Advances in flexible endoscope technology and equipment have provided the opportunity to improve adenoma detection rates. Advanced techniques are now available to safely remove adenomas, both small and large. In years past, patients discovered to have large adenomas considered too large to remove endoscopically were referred for surgical resection. Advanced endoscopic techniques, including endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD), have given endoscopists the opportunity to offer patients a minimally invasive approach to remove difficult colorectal polyps. While both techniques can be useful in avoiding major surgical resection for pre-malignant lesions, there are some key differences between the two. EMR is widely accepted for the resection of larger adenomatous polyps, however, larger lesions can be difficult to remove completely [9]. ESD can be used to improve completeness of resection (R0) and thereby decrease recurrence rates. A recent meta-analysis comparing EMR to ESD utilized data from 6 trials and pooled evaluation of 1642 adenomatous polyps. ESD was associated with higher en bloc resection and lower local recurrence. The complication rates were similar, however, ESD was more time consuming.

G. Advanced trans-anal approaches are also available for patients with large rectal polyps. Transanal endoscopic microsurgery (TEMS) and transanal minimally invasive surgery (TAMIS) techniques have become more widespread and can allow for safe removal of accessible lesions. In a recent meta-analysis comparing TEMS to conventional transanal excision, TEMS was associated with a higher rate of negative margins, less specimen fragmentation and lower recurrence rates, with no difference in overall complications. Recently, TAMIS has grown in popularity since its initial description in 2010 by Atallah et al. While high quality data are still lacking, TAMIS has

also shown promising results, comparable to TEMS [14] in terms of achieving negative margins and minimizing polyp recurrence.

H. Surgical resection of the colon or rectum for endoscopically unresectable adenomatous polyps, outside of transanal approaches, usually requires partial colectomy. Patients deemed appropriate surgical candidates are offered abdominal surgery, which can be done in traditional open fashion or by utilizing minimally invasive techniques. In general, traditional oncologic principles are followed during the resection, as larger adenomatous polyps can harbor invasive cancer. Some series report that for larger polyps between 1.5 cm and 3.5 cm in diameter, the risk of harboring an invasive cancer can range from 19 to 43%. Ensuring adequate lymphadenectomy in this setting is important for cancer staging.

I. Cancer within a polyp: Endoscopic vs surgical resection.

Adenomatous polyps with foci of invasive cancer can be a management dilemma. The risk of lymphatic spread is directly correlated with the T-stage of the lesion. For pedunculated or sessile adenomatous polyps identified at colonoscopy, endoscopic resection can be entertained, if deemed appropriate by the endoscopist. Patients with pedunculated adenomatous polyps with foci of invasive cancer excised in 1 piece with clear margins, confirmed to be T1 in depth and with favorable histologic features (well or moderately differentiated, absent lymphovascular invasion) can safely observed without resection. For sessile lesions with the same above features, both observation and radial resection can be considered appropriate treatment.

The Haggitt Classification system for pedunculated polyps with foci of invasive cancer is useful to describe the level of invasion into the submucosa. Haggitt level 1 lesions have the component of adenocarcinoma limited to the head of the polyp. Level 2 lesions have the adenocarcinoma extend to the neck of the polyp. Level 3 lesions have cancer extension to the stalk of the polyp, and in level 4 lesions extend beyond the stalk, but still limited to the submucosa. Haggitt levels 1–3 are associated with a very low rate of lymph node metastasis, and these lesions can be safely managed with endoscopic polypectomy.

Suggested Reading

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