Polyps of the large intestine

Polyps of the large intestine represent one of the most commonly examined biopsies in the pathological practise. Differential diagnosis of individual polyps is of great importance for each patient's care, since different types of polyps may differ clinically.

Polyps can be divided into 3 groups:

- sporadic epitelial polyps (neoplastic polyps),
- sporadic mesenchymal polyps,
- syndrome associated polyps.

Neoplastic colorectal polyps

Colorectal adenoma

Colorectal adenoma is a benign epithelial tumor of the large intestine, which represents the most frequent occurence of intestinal polyps. It is a pre-cancerous lesion, which can turn into colorectal carcinoma after malignant transformation. Macroscopically, the lesions protrude above the surrounding mucosa. Histologically, colorectal adenoma is divided to 3 groups according to its architecture:

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- tubular adenoma,
- tubulovillous adenoma,
- villous adenoma.

Adenoma is formed from the dysplastic epithelium of the mucosal epithelium found in the large intestine. The nuclei tend to be elongated to brush-like, enlarged, with pseudo-stratification and nuclear hyperchromasia. Adenoma can be classified as low-grade and high-grade, whereas high-grade adenoma is presented with nuclear pleomorphism, the architecture is complex and cell polarity is blurred.

Molecullary the occurence of adenoma is connected with APC/β-catetin pathway, key step is loss-of-function mutation of APC gene. This mutation is is common is some syndromes, the basic difference is that in sporadic adenoma both copies of the gene need to be affected.

Although this type of polyp occurs sporadically, it can be connected with hereditary occurance in the form of autosomal dominant amiliar adenomatosis polyposis. This syndrome is characterised by the presence of hundreds to thousands of polyps, which have a potential for malignant transformation. Morphologically these polyps are indistinguishable from sporadic polyps.

Serrated lesion

Serrated lesions are a newly defined group of large intestine polyps, whose name stems from their epithelial arrangement in the nature of "saw-teeth". There are 3 groups of polyps:

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- Sessile serrated adenoma,
- Hyperplastic polyp,
- Traditional serrated adenoma.

Sessile serrated adenoma

Sessile serrated adenoma is a benign epithelial tumor of the large intestine, where the lesions are capable of malignant transformation into colorectal carcinoma, which is molecularly different from classical colorectal carcinoma.

Sessile serrated adenoma usually grows on the right colon, macroscopically it is a lession larger than 1 cm. Microscopically, branching and serration of the crypts can be noted, the characteristic epithelial growth is caused by a damage in apoptosis. Nuclei are usually medium-sized with small nucleoli. In general, dysplastic changes are quite inconspicuous on the molecular level, thus crypt changes are the deterministic diagnostic factor as opposed to dysplasia. Sometimes, cellular dysplasia can be evident, presenting a subtype of sessile serrated adenoma with cellular (cytological) dysplasias.

Sessile serrated adenoma without cellular dysplasia has a risk for malignant transformation into colorectal carcinoma, sessile serrated adenoma with dysplasia has a hypothetically even higher risk of colorectal carcinoma development, however the published data are not very strong due to hard monitoring and low frequency.

Molecularly sessile serrated adenomas are connected with a different pathway, which will probably be looked into more in the future. Changes in the methylation phenotype, changes in the MLH1 repair gene expression and BRAF mutations.

Traditional serrated adenoma

Traditional serrated adenoma is a rare variant of the serrated lesion, which also has a potential for malignant transformation.

Hyperplastic polyp

Most serrated lesions are presented with hyperplasia. The risk for malignant transformation is low, especially smaller hyperplastic polyps apparently have a comparable risk for malignant transformation as the intact intestinal epithelium.

Hyperplastic polyps usually present as small sessile to flat lesions most commonly found in the rectosigmoid. Histologically they can be divided into 3 types:

- microvesicular hyperplastic polyp,
- hyperplastic polyp with goblet cells,
- mucin-poor hyperplastic polyp.

Microscopical difference between hyperplastic and serrated adenoma is difficult, there are relatively complicated diagnostic criteria.

Serrated lesions are mostly sporadic, serrated polyposis syndrome occurence is rare , while serrated lesions with a risk of malignant transformation are significantly more common.

Polyps associated syndromes

Peutz-Jeghers syndrome

In patients with Peutz-Jeghers syndrome Hamartomatous polyps may occur along the entire gastrointestinal tract, sparring the esophagus. Macroscopically, they are large lobed, pedunculated polyps. Histologically they are formed by branching smooth muscle cells along which the mucosa spreads.

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Peutz-Jeghers syndrome has a higher risk of malignant transformation.

Juvenile polyp

Juvenile polyp (retention polyp) is the most common intestinal polyp of childhood. Usually it's a sporadically occuring polyp, however, it can also manifest as part of juvenile polyposis, which is characterised by a big amount of polyps.

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Macroscopically they usually are large stalked polyps with a red granular surface. Histologically the polyp is formed by an edematous inflammatory stroma, into which mucous-filled dilated glands lined with epithelium are embedded. The epithelium is usually intact, however, dysplastic changes can occur as a result of juvenile polyposis syndrome. Erosions with subsequent granulomatous tissue formation can be found on the surface.

Juvenile polyposis syndrome is a risk factor for the development of adenocarcinoma the gastrointestinal and hepatobiliary tract.

Cronkhite-Canada syndrome

Cronkhite-Canada syndrome is a rare, non-hereditary syndrome which is characterised by a big amount of intestinal polyps similar to juvenile polyposis polyps. In this syndrome, the polyps are macroscopically sessile on a broad base, dilated glands are found on the polyps but also on the intact mucosa, and, dysplasia never occurs.

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Due to low number of cases, it is not clear wether the polyps have malignant potential.

Cowden syndrome

Cowden syndrome is an autosomal dominant disorder associated with the high number of hamaromas in the large intestine. Cowden syndrome represents a risk factor for some malignancies, however, not for malignancies of large intestine.

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Mesenchymal polyps

Fibroplastic polyp (Colonic perineuroma)

Fibroplastic polyp, resp. colonic perineuroma, is a benign lesion occuring anywhere in the intestine, most common in the large intestine. Macroscopically it is a small, flat, sessile polyp. Histologically it is formed by fine spindle cells with oval nuclei and a clear cytoplasm. Neither cellular atypia nor mitosis are detectable. Remission does not occur after resection excision.

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Ganglioneuroma

Ganglioneuroma is usually a solitary sporadic benign tumor. Macroscopically, there is a small knot in lamina propria, which elevates the adjacent epithelium in the form of a sessile polyp, sometimes also in the form of a pedunculated polyp. Histologically, it is formed by spindle cells (Schwann cells), a fibrilar matrix and irregularly scattered nests of ganglion cells. Tumor growth disrupts the crypt architecture, which tend to be twisted. Ganglioneuroma can spread to the submucosa, where nerves can be tied in the tumor.

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In addition to sporadic occurence, they can also occur in some hereditary syndromes:

- multiple endocrine neoplasia 2B,
- neurofibromatosis type 1,
- familiární adenomatózní polypóza.

Ganglioneuromas that occur as part of a hereditary syndrome are larger, have more ganglion cells and usually have a filiform arrangement. Sometimes there can be an extensive poorly defined transmural process called ganglioneuromatosis.

Schwannoma

Schwannoma occuring in the large intestine differs to schwannoma of peripheral tissues mainly in that they aren't encapsulated and have a pronounced lymphoid cuff. A less common variant is the psammomatous melanotic schwannoma. They probably also differ genetically from conventional schwannomas because they show strong immunochemical positivity to S100 and negativity to KIT.

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Mucosal hamartoma of Schwann cells

Mucosal hamartoma of Schwann cells is usually a small knot, which is an incidental finding in colonoscopy. Most commonly found in the sigmoid colon and rectum, but it can manifest anywhere along the large intestine. Histologically, there are poorly-differentiated spindle cells without apparent proliferation or atypia in the lamina propria of surrounding crypts.

Benign epithelioid tumor of nerve sheath

Benign epithelioid tumor of nerve sheath is usually detected incidentally in elderly patients. Histologically, it's formed by spindle to predominantly epithelioid cells. The tumor grows from lamina propria and usually extends towards the submucosa. Pseudoinclusions are usually visible in the nuclei, the cytoplasm is eosinophilic fibrillar. Proliferation is low, mitoses are not usually detected, Ki67 positivity is low.

Leiomyoma

Leiomyomas of the large intestine are rare benign mesenchymal tumors. Usually present as a small flat whitish polyp of the large intestine and rectum, covered with epithelium, which may be intact, they may undergo pressure atrophy, or may be exceptionally ulcerated. These are well-defined nodules of proliferating cells of the submucosal smooth muscle, usually neither mitosis nor necrosis is detectable. Sometimes it may show marked nuclear atypia with nuclear hyperchromasia.

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Gastrointestinal stromal tumor

Gastrointestinal stromal tumor is a mesenchymal tumor arising from Cajal cells. It can manifest anywhere along the GI tract, however its not common in the large intestine. Biologically its behavior is uncertain, in locations where it is more common, the malignant potential can be inferred mainly by the size of the tumor and by mitotic activity.

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Makroskopically it usually presents as a node on the wall of the colon, covered by an intact or ulcerated epithelium. It can present with some histological variants, in the colon spindle cell-type predominate. Characteristically for gastrointestinal stromal tumor, there is KIT expression, but its often negative in colonic growth.

Fibrovascular polyp

Fibrovascular polyp of the rectum is extremelly rare. Histologically, it is formed by spindle cells in a fibrovascular tissue with chronic inflammatory infiltrate.

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Granular cell tumor

Granular cell tumor (Abrikossoff's tumor) is a benign tumor, with a rare occurence in the large intestine. Makroskopically, it presents as a small submucosal nodule. It is formed by polygonal cells with abundant eosinophilic granular cytoplasm and smooth nuclei.

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Lipoma

Lipomas rarely occur in the large intestine, in the right colon. Usually they are small and asymptomatic, sometiems they can grow and become symptomatic. Histologically, they're formed by mature adipocytes. Exceptionally, a higher occurence of lipomas is connected with ganglioneuromatosis of the large intestine or with Cowden syndrome.

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Lipoma is sometimes described as an increase in adipose tissue in the ileocecal junction, but it is possible that in this case its a pseudotumor caused by prolapse of submucosal adipose tissue.

Hemangioma

Gastrointestinal hemangiomas are relatively rare benign tumors. Makroskopically they present as red to bluish polypoid lesion, clinically it presents with bleeding. Histologically, manifests in two forms:

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- capillary hemangioma,
- cavernous hemangioma.

They can manifest either as sporadic lesions or part of a hereditary syndrome, usually the following:

- Klippel–Trénaunay syndrome,
- Bean syndrome (blue rubber bleb syndrome).

Lymphagioma

Lymphagioma is a rare benign tumor in the colon. Usually manifests as a submucosal polypoid lesion, which can manifest either with bleeding or abdominal pain. Histologically, it can occur as either of the three following types:

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- capillary lymphagioma,
- cavernous lymphagioma,
- cystic lymphagioma.

Usually it is solitary, however, a few cases have described the occurence of lymphangiomatosis of the colon.

Xantoma

Colonic xantoma is a rare, incidental colonoscopic finding. Makroskopically it appears as a papule or polyp, mikroskopically there are numerous macrophages with a foamy cytoplasm. Surface epithelium is usually hyperplastic.

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It is not associated with cutaneous xanthoma, however, it looks like it could be associated with diabetes, hyperlipidemia and chronic constipation. Commonly, it appears with other types of polyps.

vanek's tumor

vanek's tumor (inflammatory fibroid polyp) is a benign mesenchymal tumor, which is rare in the intestine. Macroscopically, it appears as a larger polypoid lesion with a wide base. Microscopically, it is characterised by the proliferation of fine spindle cells in a fibromyxoid stroma with an inflammatory infiltrate, dominated with eosinophils. Mitoses can be evident, nuclear pleomorphism is extremely uncommon. The polyp grows from the submucosa.

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Inflammatory polyp

Inflammatory polyp (pseudopolyp) is actually a regenerative response to non-specific intestinal inflammation (IBD) and some intestinal infections, other conditions, such as local trauma. The crypts are usually dilated or twisted and the lamina propria is filled with inflammatory infiltrate. The infiltrate can be acute or chronic depending on the cause and course. The adjacent epithelium is also infiltrated and erosions with granulation tissue are not uncommon. Generally, reactive changes are rather marked. To distinguish between an inflammatory polyp and non-specific intestinal inflammations, a biopsy needs to be done from the macroscopically intact section.

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Post-inflammation filiform polyps can appear in areas with previous mucosal ulceration. Macroscopically, it manifests as long finger-like formations. Histologically, they are formed by cylindrical growths of submucosa surrounded on all sides by mucosa with thinned or absent muscularis mucosae.

Mucosal prolapse

The mucosa can be penetrated anywhere in the colon. Result of a prolapse is a solitary ,rather ,less conspicuous polyp. Histologically, the polyp formed on the basis of mucosal prolapse is characterized by hypertrophy of the muscularis mucosae, which can lead to the penetration of the smooth muscle into the lamina propria, fibrosis can occur. These changes lead to crypt distortion, changes in the shape of the crypts can take on the appearance of a diamond. Sometimes, there can be serration which is typical for serrated lesions, therefore it can lead to diagnostic errors. Surface epithelium can be ulcerated and thus manifest with reparative changes.

Several types of lesions are connected with mucosal prolapse, which can underlie the polyp:

- **solitary rectal ulcer syndrome**,
- **inflammatory cloacogenic polyp**,
- mucosal prolapse in diverticulosis.

References

Related articles

- Colorectal carcinoma
- Serrated lesions
- Vienna Classification of Gastrointestinal Neoplasias (2002)
- Colonoscopu
- Intestinum crassum

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