# Juvenile polyposis syndrome

## Key facts

- Juvenile polyposis syndrome (JPS) is a dominantly inherited disorder, resulting in an increased risk of gastric and colorectal cancer, with additional characteristic manifestations.
- This is a rare condition, affecting approximately 1 in 150,000 individuals.
- The defining feature is the development of characteristic juvenile polyps in the large bowel.
- Colonoscopy with removal of polyps is usually sufficient to control polyps in the large bowel; the role of polypectomy in the upper GI tract is not established.

## Clinical features

- Affected individuals may present with features at any age.
- Juvenile polyps occur sporadically, often in children; JPS is only likely if more than four such polyps are present.
- Small bowel polyps are rare, and tend to lead to protein-losing enteropathy when they occur in infancy or childhood.
- Overall cancer risks are currently estimated at 60% for colorectal cancer and 20% for gastric cancer by 60 years of age, though these figures could be overestimated.

## Diagnosis

- Some individuals present with symptoms caused by large polyps (anaemia, bleeding, prolapsing polyps), and are found to have JPS when endoscopy is performed.
- Predictive testing of at-risk individuals (first-degree relatives of those affected) should be offered from between the ages of 12 and 14, or earlier if symptomatic.
- If predictive testing is not possible (in other words, when no genetic mutation can be identified in an affected individual), the person at risk should be offered coloscopy from 15 years of age, and repeated every five years, if no polyps are detected.

## Genetic basis

- JPS is caused by variants in the *BMPR1A* or *SMAD4* genes, although no genetic variant can be identified in between 20% and 30% of cases.
- These genes each code for a protein, and these proteins are components of the TGFβ signal transduction pathway.
- Severe polyposis in the stomach and/or duodenum is nearly always confined to those with *SMAD4* variants.
- Individuals with *SMAD4* variants are also at risk of hereditary haemorrhagic telangiectasia (HHT). Features of this condition include nasopharyngeal and gastrointestinal telangiectasia (causing epistaxis and GI bleeding), pulmonary arteriovenous fistulae, cardiac structural abnormalities and intracerebral haemorrhage.

## Clinical management

- Colonoscopy should be performed once every one to three years (depending on polyp burden) from the age of 15, or earlier if symptomatic.
- Upper GI endoscopy should be performed once every one to three years (depending on polyp burden) from the age of 18 (*SMAD4* variant carriers) or 25 (*BMPR1A* variant carriers).
- Frequency of endoscopy should be tailored to the individual and polyp burden. Initially, frequent therapeutic endoscopies (every three to six months) may be required to remove all polyps. The frequency can then be decreased, but should continue at least every three years.
- In severe cases where polyps cannot be managed endoscopically, gastrectomy and/or colectomy may be required.
- All patients with an identified *SMAD4* variant should be referred to their local HHT specialist centre for screening and advice.

## Direction to further reading, guidelines and patient groups


- Management of juvenile polyposis syndrome in children and adolescents: a position paper from the ESPGHAN Polyposis Working Group. Cohen S, Hyer W, Mas E, et al. J Pediatr Gastroenterol Nutr 2019;68:453–62.
- Guidelines for the management of hereditary colorectal cancer from the British Society of Gastroenterology (BSG)/Association of Coloproctology of Great Britain and Ireland (ACPGBI)/United Kingdom Cancer Genetics Group (UKCGG). Monahan KJ, Bradshaw N, Dolwani S Hereditary CRC guidelines eDelphi consensus group, et al. Gut 2020;69:411-444.

- Patient support group - www.polypeople.online
- St Mark's Hospital Polyposis Registry - www.polyposisregistry.org.uk

*This information is intended for educational use and was current in June 2019. For clinical management, it is recommended that local guidelines and protocols are used.*

*Produced in collaboration with The Polyposis Registry, St Mark's Hospital.*