

= Crohn 's disease =

Crohn 's disease is a type of inflammatory bowel disease (IBD) that may affect any part of the gastrointestinal tract from mouth to anus . Signs and symptoms often include abdominal pain , diarrhea (which may be bloody if inflammation is severe) , fever , and weight loss . Other complications may occur outside the gastrointestinal tract and include anemia , skin rashes , arthritis , inflammation of the eye , and feeling tired . The skin rashes may be due to infections as well as pyoderma gangrenosum or erythema nodosum . Bowel obstruction also commonly occurs and those with the disease are at greater risk of bowel cancer .

Crohn 's disease is caused by a combination of environmental , immune and bacterial factors in genetically susceptible individuals . It results in a chronic inflammatory disorder , in which the body 's immune system attacks the gastrointestinal tract possibly directed at microbial antigens . While Crohn 's is an immune related disease , it does not appear to be an autoimmune disease (in that the immune system is not being triggered by the body itself) . The exact underlying immune problem is not clear ; however , it may be an immunodeficiency state . About half of the overall risk is related to genetics with more than 70 genes found to be involved . Tobacco smokers are two times more likely to develop Crohn 's disease than nonsmokers . It also often begins after gastroenteritis . Diagnosis is based on a number of findings including biopsy and appearance of the bowel wall , medical imaging and description of the disease . Other conditions that can present similarly include irritable bowel syndrome and Behçet 's disease .

There are no medications or surgical procedures that can cure Crohn 's disease . Treatment options can only help with symptoms , maintain remission , and prevent relapse . In those newly diagnosed , a corticosteroid may be used for a brief period of time to quickly improve the disease with another medication such as either methotrexate or a thiopurine used to prevent recurrence . An important part of treatment is the stopping of smoking among those who do . One in five people with the disease are admitted to hospital each year , and half of those with the disease will require surgery for the disease at some point over a ten @-@ year period . While surgery should be used as little as possible , it is necessary to address some abscesses , certain bowel obstructions , and cancers . Checking for bowel cancer via colonoscopy is recommended every few years , starting eight years after the disease has begun .

Crohn 's disease affects about 3 @. @ 2 per 1 @, @ 000 people in Europe and North America . It is less common in Asia and Africa . It has historically been more common in the developed world . Rates have , however , been increasing , particularly in the developing world , since the 1970s . Inflammatory bowel disease resulted in 35 @, @ 000 deaths in 2010 and those with Crohn 's disease have a slightly reduced life expectancy . It tends to start in the teens and twenties , although it can occur at any age . Males and females are equally affected . The disease was named after gastroenterologist Burrill Bernard Crohn , who , in 1932 , together with two other colleagues at Mount Sinai Hospital in New York , described a series of patients with inflammation of the terminal ileum of the small intestine , the area most commonly affected by the illness .

= = Signs and symptoms = =

= = = Gastrointestinal = = =

Many people with Crohn 's disease have symptoms for years prior to the diagnosis . The usual onset is between 15 and 30 years of age , but can occur at any age . Because of the ' patchy ' nature of the gastrointestinal disease and the depth of tissue involvement , initial symptoms can be more subtle than those of ulcerative colitis . People with Crohn 's disease experience chronic recurring periods of flare @-@ ups and remission .

Abdominal pain may be the initial symptom of Crohn 's disease usually in the lower right area . It is often accompanied by diarrhea , especially in those who have had surgery . The diarrhea may or may not be bloody . The nature of the diarrhea in Crohn 's disease depends on the part of the small

intestine or colon involved . Ileitis typically results in large @-@ volume , watery feces . Colitis may result in a smaller volume of feces of higher frequency . Fecal consistency may range from solid to watery . In severe cases , an individual may have more than 20 bowel movements per day and may need to awaken at night to defecate . Visible bleeding in the feces is less common in Crohn 's disease than in ulcerative colitis , but may be seen in the setting of Crohn 's colitis . Bloody bowel movements typically come and go , and may be bright or dark red in color . In the setting of severe Crohn 's colitis , bleeding may be copious . Flatulence and bloating may also add to the intestinal discomfort .

Symptoms caused by intestinal stenosis are also common in Crohn 's disease . Abdominal pain is often most severe in areas of the bowel with stenoses . Persistent vomiting and nausea may indicate stenosis from small bowel obstruction or disease involving the stomach , pylorus , or duodenum . Although the association is greater in the context of ulcerative colitis , Crohn 's disease may also be associated with primary sclerosing cholangitis , a type of inflammation of the bile ducts .

Perianal discomfort may also be prominent in Crohn 's disease . Itchiness or pain around the anus may be suggestive of inflammation , fistulization or abscess around the anal area or anal fissure . Perianal skin tags are also common in Crohn 's disease . Fecal incontinence may accompany perianal Crohn 's disease . At the opposite end of the gastrointestinal tract , the mouth may be affected by non @-@ healing sores (aphthous ulcers) . Rarely , the esophagus , and stomach may be involved in Crohn 's disease . These can cause symptoms including difficulty swallowing (dysphagia) , upper abdominal pain , and vomiting .

== Systemic ==

Crohn 's disease , like many other chronic , inflammatory diseases , can cause a variety of systemic symptoms . Among children , growth failure is common . Many children are first diagnosed with Crohn 's disease based on inability to maintain growth . As it may manifest at the time of the growth spurt in puberty , up to 30 % of children with Crohn 's disease may have retardation of growth . Fever may also be present , though fevers greater than 38 @.@ 5 ° C (101 @.@ 3 ° F) are uncommon unless there is a complication such as an abscess . Among older individuals , Crohn 's disease may manifest as weight loss , usually related to decreased food intake , since individuals with intestinal symptoms from Crohn 's disease often feel better when they do not eat and might lose their appetite . People with extensive small intestine disease may also have malabsorption of carbohydrates or lipids , which can further exacerbate weight loss .

== Extraintestinal ==

In addition to systemic and gastrointestinal involvement , Crohn 's disease can affect many other organ systems . Inflammation of the interior portion of the eye , known as uveitis , can cause blurred vision and eye pain , especially when exposed to light (photophobia) . Inflammation may also involve the white part of the eye (sclera) , a condition called episcleritis . Both episcleritis and uveitis can lead to loss of vision if untreated .

Crohn 's disease that affects the ileum may result in an increased risk for gallstones . This is due to a decrease in bile acid resorption in the ileum and the bile gets excreted in the stool . As a result , the cholesterol / bile ratio increases in the gallbladder , resulting in an increased risk for gallstones .

Crohn 's disease is associated with a type of rheumatologic disease known as seronegative spondyloarthropathy . This group of diseases is characterized by inflammation of one or more joints (arthritis) or muscle insertions (enthesitis) . The arthritis in Crohn 's disease can be divided into two types . The first type affects larger weight @-@ bearing joints such as the knee (most common) , hips , shoulders , wrists , or elbows . The second type symmetrically involves five or more of the small joints of the hands and feet . The arthritis may also involve the spine , leading to ankylosing spondylitis if the entire spine is involved or simply sacroiliitis if only the sacroiliac joint is involved . The symptoms of arthritis include painful , warm , swollen , stiff joints , and loss of joint mobility or

function .

Crohn 's disease may also involve the skin , blood , and endocrine system . The most common type of skin manifestation , erythema nodosum , presents as raised , tender red nodules usually appearing on the shins . Erythema nodosum is due to inflammation of the underlying subcutaneous tissue , and is characterized by septal panniculitis . Another skin lesion , pyoderma gangrenosum , is typically a painful ulcerating nodule . Crohn 's disease also increases the risk of blood clots ; painful swelling of the lower legs can be a sign of deep venous thrombosis , while difficulty breathing may be a result of pulmonary embolism . Autoimmune hemolytic anemia , a condition in which the immune system attacks the red blood cells , is also more common in Crohn 's disease and may cause fatigue , a pale appearance , and other symptoms common in anemia . Clubbing , a deformity of the ends of the fingers , may also be a result of Crohn 's disease . Finally , Crohn 's disease increases the risk of osteoporosis , or thinning of the bones . Individuals with osteoporosis are at increased risk of bone fractures .

People with Crohn 's disease often have anemia due to vitamin B12 , folate , iron deficiency , or due to anemia of chronic disease . The most common is iron deficiency anemia from chronic blood loss , reduced dietary intake , and persistent inflammation leading to increased hepcidin levels , restricting iron absorption in the duodenum . As Crohn 's disease most commonly affects the terminal ileum where the vitamin B12 / intrinsic factor complex is absorbed , B12 deficiency may be seen . This is particularly common after surgery to remove the ileum . Involvement of the duodenum and jejunum can impair the absorption of many other nutrients including folate . If Crohn 's disease affects the stomach , production of intrinsic factor can be reduced .

Crohn 's disease can also cause neurological complications (reportedly in up to 15 %) . The most common of these are seizures , stroke , myopathy , peripheral neuropathy , headache and depression .

People with Crohn 's often also have issues with small bowel bacterial overgrowth syndrome , which has similar symptoms .

In the oral cavity people with Crohn 's may develop cheilitis granulomatosa and other forms of orofacial granulomatosis , pyostomatitis vegetans , recurrent aphthous stomatitis , geographic tongue , and migratory stomatitis in higher prevalence than the general population .

= = Cause = =

While the exact cause is unknown , Crohn 's disease seems to be due to a combination of environmental factors and genetic predisposition . Crohn 's is the first genetically complex disease in which the relationship between genetic risk factors and the immune system is understood in considerable detail . Each individual risk mutation makes a small contribution to the overall risk of Crohn 's (approximately 1 : 200) . The genetic data , and direct assessment of immunity , indicates a malfunction in the innate immune system . In this view , the chronic inflammation of Crohn 's is caused when the adaptive immune system tries to compensate for a deficient innate immune system .

= = = Genetics = = =

Crohn 's has a genetic component . Because of this , siblings of known people with Crohn 's are 30 times more likely to develop Crohn 's than the general population .

The first mutation found to be associated with Crohn 's was a frameshift in the NOD2 gene (also known as the CARD15 gene) , followed by the discovery of point mutations . Over thirty genes have been associated with Crohn 's ; a biological function is known for most of them . For example , one association is with mutations in the XBP1 gene , which is involved in the unfolded protein response pathway of the endoplasmic reticulum . Other well documented genes which increase the risk of developing Crohn disease are ATG16L1 , IL23R , IRGM , and SLC11A1 . There is considerable overlap between susceptibility loci for IBD and mycobacterial infections . Recent genome @-@ wide association studies have shown that Crohn ? s disease is genetically linked to coeliac disease .

= = = Immune system = = =

There was a prevailing view that Crohn 's disease is a primary T cell autoimmune disorder , however , a newer theory hypothesizes that Crohn 's results from an impaired innate immunity . The later hypothesis describes impaired cytokine secretion by macrophages , which contributes to impaired innate immunity and leads to a sustained microbial @-@ induced inflammatory response in the colon , where the bacterial load is high . Another theory is that the inflammation of Crohn 's was caused by an overactive Th1 and Th17 cytokine response .

In 2007 , the ATG16L1 gene has been implicated in Crohn 's disease , which may induce autophagy and hinder the body 's ability to attack invasive bacteria . Another study has theorized that the human immune system traditionally evolved with the presence of parasites inside the body , and that the lack thereof due to modern hygiene standards has weakened the immune system . Test subjects were reintroduced to harmless parasites , with positive response .

= = = Microbes = = =

Current thinking is that microorganisms are taking advantage of their host 's weakened mucosal layer and inability to clear bacteria from the intestinal walls , which are both symptoms of Crohn 's . Different strains found in tissue and different outcomes to antibiotics therapy and resistance suggest Crohn 's Disease is not one disease , but an umbrella of diseases related to different pathogens .

A number of studies have suggested a causal role for *Mycobacterium avium* subspecies paratuberculosis (MAP) , which causes a similar disease , Johne 's disease , in cattle .

NOD2 is a gene involved in Crohn 's genetic susceptibility . It is associated with macrophages ' diminished ability to phagocytize MAP . This same gene may reduce innate and adaptive immunity in gastrointestinal tissue and impair the ability to resist infection by the MAP bacterium . Macrophages that ingest the MAP bacterium are associated with high production of TNF @-@ ? .

Other studies have linked specific strains of enteroadherent *E. coli* to the disease . Adherent @-@ invasive *Escherichia coli* (AIEC) , are more common in people with CD , have the ability to make strong biofilms compared to non @-@ AIEC strains correlating with high adhesion and invasion indices of neutrophils and the ability to block autophagy at the autolysosomal step , which allows for intracellular survival of the bacteria and induction of inflammation . Inflammation drives the proliferation of AIEC and dysbiosis in the ileum , irrespective of genotype . AIEC strains replicate extensively into macrophages inducing the secretion of very large amounts of TNF @-@ ? .

Mouse studies have suggested some symptoms of Crohn 's disease , ulcerative colitis , and irritable bowel syndrome have the same underlying cause . Biopsy samples taken from the colons of all three patient groups were found to produce elevated levels of a serine protease . Experimental introduction of the serine protease into mice has been found to produce widespread pain associated with irritable bowel syndrome , as well as colitis , which is associated with all three diseases . Regional and temporal variations in those illnesses follow those associated with infection with the protozoan *Blastocystis* .

The " cold @-@ chain " hypothesis is that psychrotrophic bacteria such as *Yersinia* and *Listeria* species contribute to the disease . A statistical correlation was found between the advent of the use of refrigeration in the United States and various parts of Europe and the rise of the disease .

There is an apparent connection between Crohn 's disease , *Mycobacterium* , other pathogenic bacteria , and genetic markers . In many individuals , genetic factors predispose individuals to *Mycobacterium avium* subsp. paratuberculosis infection . This bacterium then produces mannins , which protect both itself and various bacteria from phagocytosis , which causes a variety of secondary infections .

Still , this relationship between specific types of bacteria and Crohn 's disease remains unclear .

= = = Environmental factors = = =

The increased incidence of Crohn 's in the industrialized world indicates an environmental component . Crohn 's is associated with an increased intake of animal protein , milk protein and an increased ratio of omega @-@ 6 to omega @-@ 3 polyunsaturated fatty acids . Those who consume vegetable proteins appear to have a lower incidence of Crohn 's disease . Consumption of fish protein has no association . Smoking increases the risk of the return of active disease (flares) . The introduction of hormonal contraception in the United States in the 1960s is associated with a dramatic increase in incidence , and one hypothesis is that these drugs work on the digestive system in ways similar to smoking . Isotretinoin is associated with Crohn 's . Although stress is sometimes claimed to exacerbate Crohn 's disease , there is no concrete evidence to support such claim . Dietary microparticles , such as those found in toothpaste , have been studied as they produce effects on immunity , but they were not consumed in greater amounts in patients with Crohn 's .

= = Pathophysiology = =

During a colonoscopy , biopsies of the colon are often taken to confirm the diagnosis . Certain characteristic features of the pathology seen point toward Crohn 's disease ; it shows a transmural pattern of inflammation , meaning the inflammation may span the entire depth of the intestinal wall . Ulceration is an outcome seen in highly active disease . There is usually an abrupt transition between unaffected tissue and the ulcer ? a characteristic sign known as skip lesions . Under a microscope , biopsies of the affected colon may show mucosal inflammation , characterized by focal infiltration of neutrophils , a type of inflammatory cell , into the epithelium . This typically occurs in the area overlying lymphoid aggregates . These neutrophils , along with mononuclear cells , may infiltrate the crypts , leading to inflammation (cryptitis) or abscess (crypt abscess) . Granulomas , aggregates of macrophage derivatives known as giant cells , are found in 50 % of cases and are most specific for Crohn 's disease . The granulomas of Crohn 's disease do not show " caseation " , a cheese @-@ like appearance on microscopic examination characteristic of granulomas associated with infections , such as tuberculosis . Biopsies may also show chronic mucosal damage , as evidenced by blunting of the intestinal villi , atypical branching of the crypts , and a change in the tissue type (metaplasia) . One example of such metaplasia , Paneth cell metaplasia , involves development of Paneth cells (typically found in the small intestine and a key regulator of intestinal microbiota) in other parts of the gastrointestinal system .

= = Diagnosis = =

The diagnosis of Crohn 's disease can sometimes be challenging , and a number of tests are often required to assist the physician in making the diagnosis . Even with a full battery of tests , it may not be possible to diagnose Crohn 's with complete certainty ; a colonoscopy is approximately 70 % effective in diagnosing the disease , with further tests being less effective . Disease in the small bowel is particularly difficult to diagnose , as a traditional colonoscopy allows access to only the colon and lower portions of the small intestines ; introduction of the capsule endoscopy aids in endoscopic diagnosis . Multinucleated giant cells , a common finding in the lesions of Crohn 's disease , are less common in the lesions of lichen nitidus .

= = = Classification = = =

Crohn 's disease is one type of inflammatory bowel disease (IBD) . It typically manifests in the gastrointestinal tract and can be categorized by the specific tract region affected . A disease of both the ileum (the last part of the small intestine that connects to the large intestine) , and the large intestine , Ileocolic Crohn 's accounts for fifty percent of cases . Crohn 's ileitis , manifest in the ileum only , accounts for thirty percent of cases , while Crohn 's colitis , of the large intestine , accounts for the remaining twenty percent of cases and may be particularly difficult to distinguish from ulcerative colitis . Gastroduodenal Crohn 's disease causes inflammation in the stomach and first part of the

small intestine , called the duodenum . Jejunoileitis causes spotty patches of inflammation in the top half of the small intestine , called the jejunum . The disease can attack any part of the digestive tract , from mouth to anus . However , individuals affected by the disease rarely fall outside these three classifications , with presentations in other areas .

Crohn 's disease may also be categorized by the behavior of disease as it progresses . These categorizations formalized in the Vienna classification of the disease . There are three categories of disease presentation in Crohn 's disease : stricturing , penetrating , and inflammatory . Stricturing disease causes narrowing of the bowel that may lead to bowel obstruction or changes in the caliber of the feces . Penetrating disease creates abnormal passageways (fistulae) between the bowel and other structures , such as the skin . Inflammatory disease (or nonstricturing , nonpenetrating disease) causes inflammation without causing strictures or fistulae .

== Endoscopy ==

A colonoscopy is the best test for making the diagnosis of Crohn 's disease , as it allows direct visualization of the colon and the terminal ileum , identifying the pattern of disease involvement . On occasion , the colonoscope can travel past the terminal ileum , but it varies from person to person . During the procedure , the gastroenterologist can also perform a biopsy , taking small samples of tissue for laboratory analysis , which may help confirm a diagnosis . As 30 % of Crohn 's disease involves only the ileum , cannulation of the terminal ileum is required in making the diagnosis . Finding a patchy distribution of disease , with involvement of the colon or ileum , but not the rectum , is suggestive of Crohn 's disease , as are other endoscopic stigmata . The utility of capsule endoscopy for this , however , is still uncertain . A " cobblestone " -like appearance is seen in approximately 40 % of cases of Crohn 's disease upon colonoscopy , representing areas of ulceration separated by narrow areas of healthy tissue .

== Radiologic tests ==

A small bowel follow @-@ through may suggest the diagnosis of Crohn 's disease and is useful when the disease involves only the small intestine . Because colonoscopy and gastroscopy allow direct visualization of only the terminal ileum and beginning of the duodenum , they cannot be used to evaluate the remainder of the small intestine . As a result , a barium follow @-@ through X @-@ ray , wherein barium sulfate suspension is ingested and fluoroscopic images of the bowel are taken over time , is useful for looking for inflammation and narrowing of the small bowel . Barium enemas , in which barium is inserted into the rectum and fluoroscopy is used to image the bowel , are rarely used in the work @-@ up of Crohn 's disease due to the advent of colonoscopy . They remain useful for identifying anatomical abnormalities when strictures of the colon are too small for a colonoscope to pass through , or in the detection of colonic fistulae (in this case contrast should be performed with iodate substances) .

CT and MRI scans are useful for evaluating the small bowel with enteroclysis protocols . They are also useful for looking for intra @-@ abdominal complications of Crohn 's disease , such as abscesses , small bowel obstructions , or fistulae . Magnetic resonance imaging (MRI) is another option for imaging the small bowel as well as looking for complications , though it is more expensive and less readily available .

== Blood tests ==

A complete blood count may reveal anemia , which commonly is caused by blood loss leading to iron deficiency (a microcytic anemia) or by vitamin B12 deficiency (a macrocytic anemia) , usually caused by ileal disease impairing vitamin B12 absorption . Rarely autoimmune hemolysis may occur . Ferritin levels help assess if iron deficiency is contributing to the anemia . Erythrocyte sedimentation rate (ESR) and C @-@ reactive protein help assess the degree of inflammation , which is important as ferritin can also be raised in inflammation . Serum iron , total iron binding

capacity and transferrin saturation may be more easily interpreted in inflammation . Anemia of chronic disease results in a normocytic anemia . Other causes of anemia include medication used in treatment of inflammatory bowel disease , like azathioprine , which can lead to cytopenia , and sulfasalazine , which can also result in folate deficiency . Testing for *Saccharomyces cerevisiae* antibodies (ASCA) and antineutrophil cytoplasmic antibodies (ANCA) has been evaluated to identify inflammatory diseases of the intestine and to differentiate Crohn 's disease from ulcerative colitis . Furthermore , increasing amounts and levels of serological antibodies such as ASCA , antilaminaribioside [Glc (?1,3) Glb (?) ; ALCA] , antichitobioside [GlcNAc (?1,4) GlcNAc (?) ; ACCA] , antimannobioside [Man (?1,3) Man (?) AMCA] , antiLaminarin [(Glc (?1,3)) 3n (Glc (?1,6)) n ; anti @-@ L] and antichitin [GlcNAc (?1,4) n ; anti @-@ C] associate with disease behavior and surgery , and may aid in the prognosis of Crohn 's disease .

Low serum levels of vitamin D are associated with Crohn 's disease . Further studies are required to determine the significance of this association .

= = = Comparison with ulcerative colitis = = =

The most common disease that mimics the symptoms of Crohn 's disease is ulcerative colitis , as both are inflammatory bowel diseases that can affect the colon with similar symptoms . It is important to differentiate these diseases , since the course of the diseases and treatments may be different . In some cases , however , it may not be possible to tell the difference , in which case the disease is classified as indeterminate colitis .

= = = Differential diagnosis = = =

Other conditions with similar symptoms as Crohn 's disease includes intestinal tuberculosis , Behçet 's disease , ulcerative colitis , nonsteroidal anti @-@ inflammatory drug enteropathy , irritable bowel syndrome and celiac disease . Irritable bowel syndrome is excluded when there are inflammatory changes . Celiac disease can 't be excluded if specific antibodies (anti @-@ transglutaminase antibodies) are negative , nor in absence of intestinal villi atrophy .

= = Management = =

There is no cure for Crohn 's disease and remission may not be possible or prolonged if achieved . In cases where remission is possible , relapse can be prevented and symptoms controlled with medication , lifestyle and dietary changes , changes to eating habits (eating smaller amounts more often) , reduction of stress , moderate activity and exercise . Surgery is generally contraindicated and has not been shown to prevent remission . Adequately controlled , Crohn 's disease may not significantly restrict daily living . Treatment for Crohn 's disease is only when symptoms are active and involve first treating the acute problem , then maintaining remission .

= = = Lifestyle changes = = =

Certain lifestyle changes can reduce symptoms , including dietary adjustments , elemental diet , proper hydration , and smoking cessation . Diets that include higher levels of fiber and fruit are associated with reduced risk , while diets rich in total fats , polyunsaturated fatty acids , meat , and omega @-@ 6 fatty acids may increase the risk of Crohn 's . Smoking may increase Crohn 's disease ; stopping is recommended . Eating small meals frequently instead of big meals may also help with a low appetite . To manage symptoms have a balanced diet with proper portion control . Fatigue can be helped with regular exercise , a healthy diet , and enough sleep . A food diary may help with identifying foods that trigger symptoms . Some people should follow a low dietary fiber diet to control symptoms especially if fibrous foods cause symptoms . Some find relief in eliminating casein (protein found in cow 's milk) and gluten (protein found in wheat , rye and barley) from their diets . They may have specific dietary intolerances (not allergies) .

== Medication ==

Acute treatment uses medications to treat any infection (normally antibiotics) and to reduce inflammation (normally aminosalicylate anti-inflammatory drugs and corticosteroids) . When symptoms are in remission , treatment enters maintenance , with a goal of avoiding the recurrence of symptoms . Prolonged use of corticosteroids has significant side effects ; as a result , they are , in general , not used for long term treatment . Alternatives include aminosalicylates alone , though only a minority are able to maintain the treatment , and many require immunosuppressive drugs . It has been also suggested that antibiotics change the enteric flora , and their continuous use may pose the risk of overgrowth with pathogens such as *Clostridium difficile* .

Medications used to treat the symptoms of Crohn 's disease include 5-aminosalicylic acid (5-ASA) formulations , prednisone , immunomodulators such as azathioprine (given as the prodrug for 6-mercaptopurine) , methotrexate , infliximab , adalimumab , certolizumab and natalizumab . Hydrocortisone should be used in severe attacks of Crohn 's disease . Biological therapies are medications used to avoid long term steroid use , decrease inflammation , and treat people who have fistulas with abscesses .

The gradual loss of blood from the gastrointestinal tract , as well as chronic inflammation , often leads to anemia , and professional guidelines suggest routinely monitoring for this . Adequate disease control usually improves anemia of chronic disease , but iron deficiency may require treatment with iron supplements . Guidelines vary as to how iron should be administered . Besides other , problems include a limitation in possible daily resorption and an increased growth of intestinal bacteria . Some advise parenteral iron as first line as it works faster , has fewer gastrointestinal side effects , and is unaffected by inflammation reducing enteral absorption .

Other guidelines advise oral iron as first line with parenteral iron reserved for those that fail to adequately respond as oral iron is considerably cheaper . All agree that severe anemia (hemoglobin under 10g / dL) should be treated with parenteral iron . Blood transfusion should be reserved for those who are cardiovascularly unstable , due to its relatively poor safety profile , lack of long term efficacy , and cost .

== Surgery ==

Crohn 's cannot be cured by surgery , as the disease eventually recurs , though it is used in the case of partial or full blockage of the intestine . Surgery may also be required for complications such as obstructions , fistulas , or abscesses , or if the disease does not respond to drugs . After the first surgery , Crohn 's usually comes back at the site where the diseased intestine was removed and the healthy ends were rejoined , however it can come back in other locations . After a resection , scar tissue builds up , which can cause strictures , which form when the intestines become too small to allow excrement to pass through easily , which can lead to a blockage . After the first resection , another resection may be necessary within five years . For patients with an obstruction due to a stricture , two options for treatment are strictureplasty and resection of that portion of bowel . There is no statistical significance between strictureplasty alone versus strictureplasty and resection in cases of duodenal involvement . In these cases , re-operation rates were 31 % and 27 % , respectively , indicating that strictureplasty is a safe and effective treatment for selected people with duodenal involvement .

Postsurgical recurrence of Crohn 's disease is relatively common . Crohn 's lesions are nearly always found at the site of the resected bowel . The join (or anastomosis) after surgery may be inspected , usually during a colonoscopy , and disease activity graded . The " Rutgeert 's score " is an endoscopic scoring system for post-operative disease recurrence in Crohn 's disease . Mild postsurgical recurrences of Crohn 's disease are graded i1 and i2 , moderate to severe recurrences are graded i3 and i4 . Fewer lesions result in a lower grade . Based on the score , treatment plans can be designed to give the patient the best chance of managing recurrence of the disease .

Short bowel syndrome (SBS , also short gut syndrome or simply short gut) is caused by the

surgical removal of part of the small intestine . It usually develops in those patients who have had half or more of their small intestines removed . Diarrhea is the main symptom , but others may include weight loss , cramping , bloating , and heartburn . Short bowel syndrome is treated with changes in diet , intravenous feeding , vitamin and mineral supplements , and treatment with medications . In some cases of SBS , intestinal transplant surgery may be considered ; though the number of transplant centres offering this procedure is quite small and it comes with a high risk due to the chance of infection and rejection of the transplanted intestine .

Bile acid diarrhea is another complication following surgery for Crohn 's disease in which the terminal ileum has been removed . This leads to the development of excessive watery diarrhea . It is usually thought to be due to an inability of the ileum to reabsorb bile acids after resection of the terminal ileum and was the first type of bile acid malabsorption recognized .

= = = Alternative medicine = = =

More than half of people with Crohn 's disease have tried complementary or alternative therapy . These include diets , probiotics , fish oil and other herbal and nutritional supplements . Some scientists have suggested more research into these is needed to discriminate between effective therapies and those that have not been found to be effective .

Acupuncture is used to treat inflammatory bowel disease in China , and is being used more frequently in Western society . At this time , evidence is insufficient to recommend the use of acupuncture .

Homeopathy is frequently used in Germany as a treatment for Crohn 's disease , though no clinical trials exist that demonstrate homeopathy is effective .

There are contradicting studies regarding the effect of medical cannabis on inflammatory bowel disease .

= = Prognosis = =

Crohn 's disease is a chronic condition for which there is no cure . It is characterised by periods of improvement followed by episodes when symptoms flare up . With treatment , most people achieve a healthy weight , and the mortality rate for the disease is relatively low . It can vary from being benign to very severe and people with CD could experience just one episode or have continuous symptoms . It usually reoccurs , although some people can remain disease free for years or decades . Most people with Crohn 's live a normal lifespan . However , Crohn 's disease is associated with a small increase in risk of small bowel and colorectal carcinoma (bowel cancer) .

= = = Complications = = =

Crohn 's disease can lead to several mechanical complications within the intestines , including obstruction , fistulae , and abscesses . Obstruction typically occurs from strictures or adhesions that narrow the lumen , blocking the passage of the intestinal contents . A fistulae can develop between two loops of bowel , between the bowel and bladder , between the bowel and vagina , and between the bowel and skin . Abscesses are walled off concentrations of infection , which can occur in the abdomen or in the perianal area . Crohn 's is responsible for 10 % of vesicoenteric fistulae , and is the most common cause of ileovesical fistulae .

Crohn 's disease also increases the risk of cancer in the area of inflammation . For example , individuals with Crohn 's disease involving the small bowel are at higher risk for small intestinal cancer . Similarly , people with Crohn 's colitis have a relative risk of 5 @. @ 6 for developing colon cancer . Screening for colon cancer with colonoscopy is recommended for anyone who has had Crohn 's colitis for at least eight years . Some studies suggest there is a role for chemoprotection in the prevention of colorectal cancer in Crohn 's involving the colon ; two agents have been suggested , folate and mesalamine preparations .

Individuals with Crohn 's disease are at risk of malnutrition for many reasons , including decreased

food intake and malabsorption . The risk increases following resection of the small bowel . Such individuals may require oral supplements to increase their caloric intake , or in severe cases , total parenteral nutrition (TPN) . Most people with moderate or severe Crohn 's disease are referred to a dietitian for assistance in nutrition .

The major significant complications of Crohn 's disease include bowel obstruction , abscesses , free perforation and hemorrhage , which in rare cases may be fatal .

Crohn 's disease can be problematic during pregnancy , and some medications can cause adverse outcomes for the fetus or mother . Consultation with an obstetrician and gastroenterologist about Crohn 's disease and all medications facilitates preventative measures . In some cases , remission occurs during pregnancy . Certain medications can also lower sperm count or otherwise adversely affect a man 's fertility .

= = Epidemiology = =

The percentage of people with Crohn 's disease has been determined in Norway and the United States and is similar at 6 to 7 @. @ 1 : 100 @, @ 000 . The Crohn 's and Colitis Foundation of America cites this number as approx 149 : 100 @, @ 000 ; NIH cites 28 to 199 per 100 @, @ 000 . Crohn 's disease is more common in northern countries , and with higher rates still in the northern areas of these countries . The incidence of Crohn 's disease is thought to be similar in Europe but lower in Asia and Africa . It also has a higher incidence in Ashkenazi Jews and smokers .

Crohn 's disease begins most commonly in people in their teens and 20s , and people in their 50s through to their 70s . It is rarely diagnosed in early childhood . It usually affects female children more severely than males . However , only slightly more women than men have Crohn 's disease . Parents , siblings or children of people with Crohn 's disease are 3 to 20 times more likely to develop the disease . Twin studies find that if one has the disease there is a 55 % chance the other will too .

The incidence of Crohn 's disease is increasing in Europe .

= = History = =

Inflammatory bowel diseases were described by Giovanni Battista Morgagni (1682 ? 1771) and by Scottish physician T. Kennedy Dalziel in 1913 .

Ileitis terminalis was first described by Polish surgeon Antoni Le?niowski in 1904 , although it was not conclusively distinguished from intestinal tuberculosis . In Poland , it is still called Le?niowski @-@ Crohn 's disease (Polish : choroba Le?niowskiego @-@ Crohna) . Burrill Bernard Crohn , an American gastroenterologist at New York City 's Mount Sinai Hospital , described fourteen cases in 1932 , and submitted them to the American Medical Association under the rubric of " Terminal ileitis : A new clinical entity " . Later that year , he , along with colleagues Leon Ginzburg and Gordon Oppenheimer , published the case series as " Regional ileitis : a pathologic and clinical entity " . However , due to the precedence of Crohn 's name in the alphabet , it later became known in the worldwide literature as Crohn 's disease .

= = Research = =

Some evidence supports the hypothesis that the bacterium *Mycobacterium avium* subspecies *paratuberculosis* (MAP) is a cause of Crohn 's disease (see also Johne 's disease) . As a result , researchers are looking at the eradication of MAP as a therapeutic option . Treating MAP using antibiotics has been examined and the results are unclear but tentatively beneficial . Vaccination against MAP is also being studied . An anti @-@ MAP vaccine appears effective in mice and cattle with MAP with no apparent side effects . Trials in human are pending .

Crohn 's is common in parts of the world where helminthic colonisation is rare and uncommon in those areas where most people carry worms . Infections with helminths may alter the autoimmune response that causes the disease . Trials of extracts from the worm *Trichuris suis* showed promising results when used in people with IBD .

Numerous preclinical studies demonstrate that activation of the CB1 and CB2 cannabinoid receptors exert biological functions on the gastrointestinal tract . Activation of CB1 and CB2 receptors in animals has shown a strong anti-inflammatory effect . Cannabinoids and / or modulation of the endocannabinoid system is a novel therapeutic means for the treatment of numerous GI disorders , including inflammatory bowel diseases like Crohn 's disease . A few small trials have looked at medical cannabis but further evidence is required to determine its usefulness .

There is no good evidence that thalidomide or lenalidomide is useful to bring about or maintain remission .