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Travellers' Diarrhoea - more than an irritation for travellers

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Travellers' diarrhoea is commonly experienced by travellers whilst abroad, especially those vis iting less developed areas of the world. The concept of travellers' diarrhoea is not recent and over time it has been given many colloquial names around the world. These include 'Montezuma's Revenge' in Mexico, 'Delhi Belly' in India, 'Kathmandu Quickstep' in Nepal and 'Kabulitis' in Afghanistan. For most individuals who develop travellers' diarrhoea it is more of an inconvenience than a cause for concern,however a significant proportion of these people will go on to develop long term post infection irritable bowel syndrome.

Travellers' Diarrhoea

What is travellers' diarrhoea?

Travellers' diarrhoea is defined as the passing of at least three watery stools within a 24-hour period, dur-ing or shortly after travel.[1,2] Abdominal cramps, fever, nausea, vomiting and blood in the stools may or may not accompany the watery stools.[1,2] The symptoms commonly last for about three to five days, often start-ing on the third day of travel, and are normally self limiting.[3]

Where does travellers' diarrhoea occur?

Diarrhoeal disease is the most common health complaint amongst travellers.[1,3] Incidence rates are normally estimated at up to 60%1 but have been reported as high as 79.9%. The incidence of travellers' diarrhoea depends greatly on destination. Areas of high risk (20-60%) are places with warm climates and where there is a high prevalence of indigenous infec-tive diarrhoea without good public health and hygiene practices; such areas include Latin America, Africa and the Indian Subcontinent.[2] The incidence of travellers' diarrhoea in intermediate risk areas is 5-20%, this category includes China, Russia, the Middle East, the Pacific and Southeast Asia.[2,4] The lowest incidence, below 5%, is found in the low risk areas including the USA, Canada, Western Europe, Japan, Australia and New Zealand.[2,4]

Who develops travellers' diarrhoea?

Any traveller can develop travellers' diarrhoea but there are certain groups of travellers who are at an increased risk, including young children and people from high-income countries.[2] Travellers' diarrhoea is more common in people travelling to tropical and subtropical countries.[2,4] It is also more prevalent in the hot season in these tropical and subtropical regions.[2] Travellers staying in room only or 'bed and breakfast' accommodation, trekking, camping or on safaris are at a higher risk. The quality of food and drink consumed by the traveller will also affect their susceptibility.[2] Finally individual host factors can also contribute to the risk of traveller's diarrhoea, those at greatest risk are the immunocompromised and individuals with gastric hypochlorhydria which may be due to medications such as protein pump inhibitors

What causes travellers' diarrhoea?

Travellers' diarrhoea can be caused by a number of infectious agents. Bacterial causes account for around 80-85% of cases. Enterotoxigenic Escherichia coli (ETEC) is the most common pathogen but other bacterial pathogens include other strains of Escherichia coli, Campylobacter, Shigella and Salmonella1.[4] Viruses cause between 10-15% of cases, viruses often implicated are Norovirus, Rotavirus and occasionally Adenovirus.[1,3,4]

Parasites are the least common cause of travellers' diarrhoea accounting for 2-10% of cases. Giardia, Cryptosporidium, Cyclospora and Entamoeba his-tolytica are commonly identified as parasitic causes of travellers' diarrhoea1.[3,4]

How do these pathogens cause travellers' diarrhoea?

The pathophysiology of travellers' diarrhoea can be basically described by two mechanisms: secretory diarrhoea and inflammatory diarrhoea.

Toxin producing organisms cause a secretory diar-rhoea involving active secretion of fluid and elec-trolytes in the gastrointestinal tract, as well as decreased absorption.[5] This is achieved by the toxins binding to receptors in the gastrointestinal luminal wall, resulting in a reversal of the normal mechanism of absorbing fluid and electrolytes in the large intes-tine.[4,5] Secretory diarrhoea has a short incubation peri-od and causes profuse watery stools1. Examples are diarrhoea due to *ETEC and vibrio cholerae.*

Inflammatory diarrhoea is caused by invasive organisms.[4] These organisms invade the bowel wall, causing mast cell degranulation and a release of cytokines and inflammatory mediators, resulting in altered gut motility and active secretion in the gut.[4] The damage causes ulceration and bleeding.[1,5] Invasive diarrhoea is often bloody and accompanied by abdominal cramps and tenesmus 1. An example is salmonellosis.

Some bacteria produce diarrhoea by a mixture of the secretory and inflammatory mechanisms.[5]

Nausea and vomiting are often predominant symptoms in viral enteric infections, this is because viruses inhibit gastric emptying hence resulting in vomiting.[4]

Parasites (e.g. Giardia Lamblia) are thought to cause diarrhoea by the production of enterotoxins and causing secretory alterations in the gut.[4]

How can travellers' diarrhoea present?

Travellers' diarrhoea has a spectrum of three over-lapping syndromes.[2,4]

1 A short-lived period of watery diarrhoea; this accounts for up to 80% of travellers' diarrhoea and can be caused by secretory or inflammatory diarrhoea.[2,4]

2 A more prolonged illness can occur, which is accompanied by fever, dysentery (diarrhoea with bleeding and often fever) or microscopic features of invasive disease (e.g. the presence of faecal leucocytes).[2,4]

3 A long-term diarrhoea lasting more than one month. This is more common in travellers that are living in close proximity to locals[4] but is thought to affect 1-3% of travellers who experience diarrhoea while away from home.[2,4]

What are the consequences of travellers' diarrhoea?

A quarter of all travellers who experience diarrhoea have to alter their original plans to accommo-date for their illness and 5% need to seek medical attention1. Travellers' diarrhoea can have a disruptive impact on travel from holidays, to volunteer work.[2]

In the short term travellers' diarrhoea can lead to dehydration and electrolyte imbalance sometimes resulting in renal impairment. It can reduce the effectiveness of certain oral medications due to reduced absorption of, for example, the contraceptive pill.[2] In very rare cases the, pathogens causing travellers' diarrhoea can spread to other parts of the body causing bacteraemia and multisystem disease.[2]

Certain pathogens come with their own specific complications, for example bacteria that produce the Shiga toxin can cause a life threatening condition called haemolytic uraemic syndrome.[1]

Irritable bowel syndrome and travellers' diarrhoea

A common complication of travellers' diarrhoea and acute enteric infections is post infective irritable bowel syndrome (PI-IBS).[1,2,4] Invasive bacteria are believed to trigger the condition in patients with no previous irritable bowel-like symptoms and exacer-bate symptoms in past and current sufferers.[2,4]

What is irritable bowel syndrome?

IBS is described as a gastrointestinal disorder that is characterized by abdominal pain and altered defe-cation, but there is no apparent structural or biological basis for these changes.[6,7] Typical symptoms include abdominal pain and discomfort, bloating, altered bowel habits, excessive wind and the urgency to defecate.

In the community IBS has a prevalence of 10-22%[6] and is one of the most common gastrointestinal com-plaints in primary and secondary care.[7,8] It is very difficult to distinguish between IBS and specific post infectious IBS, but one study showed that 6-17% of IBS patients believed that their symptoms arose from an enteric infection.[9]

What is the connection between irritable bowel syndrome and travellers' diarrhoea?

Chaudhary et al. first established a link between acute gastroenteritis and IBS in 1962.[10] More recently IBS has been shown to occur with an incidence of 4-13% after bacterial gastroenteritis.[9] It is now widely accepted that 5-10% of individuals who suffer from travellers' diarrhoea while away will go on to develop PI-IBS, characterised by pain and discomfort with changes in stool form at six months after infection.[2,4,6,8,9]

Several risk factors which can affect the chance of developing PI-IBS following travellers' diarrhoea. The risk increases with a severe bout of acute diarrhoea,[4] and when a prolonged fever is present during the infection.[6] Females and individuals under the age of 60 years are more likely to develop PI-IBS4.

What changes of the bowel occur in irritable bowel syndrome?

The pathology of IBS is not fully understood and it is a current area of research.[6-8] Recent investigations believe that many mechanisms are involved. Altered motor function of the gastrointestinal tract is believed to be important, as IBS patients have been shown to have an exaggerated intestinal motor response to meal ingestion, stress and mechanical stimulation, com-pared to healthy subjects.[7,8]

IBS patients are also believed to have visceral hypersensitivity, meaning they have a decreased threshold to rectal distension.[7,8] This increase in senso-ry perception within the gastrointestinal tract could lead to difficultly in IBS patients expelling gas, accounting for the symptoms of bloating and abdominal distension.[7]

Inflammation and immune cell infiltration is believed to play a role in the pathogenesis of IBS, but these mechanisms occur a low level undetectable by endoscopic investigations. Inflammatory mediators released are believed to affect the functions of enteric nerves and cause abnormal secreto-motor responses.[7,8]

It has been well documented that psychosocial factors can influence the symptoms of IBS. Acute stress is believed to activate mucosal inflammatory cells causing a release of corticotrophin releasing factor; this in turn can affect gut motor function and visceral perception.[7,8]

Other factors which are believed to play a role in IBS are changes in the microflora of the gastrointestinal tract[8] and changes to serotonin levels or receptors.[7] Genetics are also thought to play a role, with the condition often clustering in families, however is not thought to be the sole

cause of the condition.[7]

How can travellers' diarrhoea lead to post infectious irritable bowel syndrome?

Infection is thought to contribute when host defence mechanisms in response to the infection alter normal bowel physiology. When an infection is present numbers of mucosal serotonin-producing enterochromaffin cells, T-lymphocytes, macrophages and pro-inflammatory cytokines increase substantially. These changes can interact with the sensory mechanisms within the gastrointestinal tract, hence affecting bowel function and sensory perception.[6-9] Infection also leads to mucosal damage within the gastrointesti-nal tract and disruption of the normal flora present; these effects could cause the prolonged dysfunction experienced in IBS.[9]

Why is this link between travellers' diarrhoea and irritable bowel syndrome important?

British citizens make many million trips abroad, with a significant proportion of these trips to less developed countries where the risk of travellers' diar-rhoea is high. It has been regularly reported that trav-ellers' diarrhoea can have an incidence as high as 60% in less developed countries.[1,2] Post infectious IBS can occur in up to 10% of individuals who have experi-enced travellers' diarrhoea.[1,2,4,6,8,9] Potentially many British citizens could be developing post infectious irritable bowel syndrome following travellers' diar-rhoea every year.

Post infectious IBS is a chronic condition that can produce life long change for the individual affected. Although the condition can improve with time, and in many cases it does, individuals with the condition often require invasive investigations such as colonoscopy to rule out other conditions. Irritable bowel syndrome sufferers also are often take regular medications and have to make changes to their life styles.

One study has suggested that irritable bowel syn-drome accounts for 12% of all general practice consul-tations and up to 50% of gastroenterologist outpatient referrals6 with a proportion of this due to PI-IBS, illus-trating the impact that the condition can have on a health service.

What can be done in the future?

The morbidity experienced with a condition such as post infectious irritable bowel syndrome, calls for more research to be done into prophylaxis that can reduce the incidence following travellers' diarrhoea.[4] Currently antibiotics used as chemoprophylaxis for travellers' diarrhoea have shown no role in preventing PI-IBS[4] and in some cases have increased the incidence.[7] If a method of prophylaxis could be developed then this could resulting in fewer individuals with the chronic condition and a lesser burden on our health service.

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