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Parasitic colitis misdiagnosis as inflammatory bowel disease in high-income settings and association with poor clinical outcomes when exposed to corticosteroids: a systematic review of case reports

Robert D Lees ,[1,2] Jenna Fyfe,[3] Laura M Woods ,[4] R Alexander Speight ,[1,2] Christopher J Stewart,[1] Richard C G Pollok ,[5,6] Christopher A Lamb [1,2]

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For numbered affiliations see end of article.

Correspondence to
Dr Robert D Lees;
robert.lees3@nhs.net

ABSTRACT

Objectives Parasitic colitis is highly prevalent worldwide, may mimic inflammatory bowel disease (IBD) and is encountered by non-specialist physicians in high-income, non-endemic settings. In this context, patients may be at risk of misdiagnosis and poor outcomes. However, cases are not routinely reported, limiting the evidence base to individual case reports. We aimed to systematically describe and evaluate the diagnosis, clinical course and outcomes of affected patients whose cases have been reported in high-income settings.

Design A systematic review of the literature using the Preferred Reporting Items for Systematic Reviews and Meta-analyses framework.

Data sources PubMed and Scopus databases were searched for publications from between 1 January 2012 and 10 January 2025.

Eligibility criteria Case reports of undifferentiated colitis presenting in high-income settings, where the aetiological agent was ultimately found to be parasitological, were eligible for inclusion. Key exclusion criteria included a history of travel to an endemic area within 4 weeks of presentation. No language restrictions were applied.

Data extraction and synthesis Key components of each case report, encompassing patient presentation, diagnosis and management, were standardised as categorical descriptors. Key themes were identified, and a thematic synthesis approach was employed.

Results 52 articles, describing 54 patients, were included in the final analysis: 33 cases of amoebiasis, 15 cases of strongyloidiasis and 6 cases of schistosomiasis. Misdiagnosis occurred in 37 out of 54 patients (69%), with 28 out of 37 (76%) of these misdiagnosed as IBD. Substantial harm was reported in 31 out of 54 (57%) patients, including death in seven patients. Major morbidity (defined as strongyloides hyperinfection syndrome, fulminant amoebic colitis, emergency surgery or sepsis) or death was associated with administration of corticosteroids in cases of strongyloidiasis and amoebiasis, occurring in 8 out of 9 (89%) and 1 out of 6 (17%) patients with strongyloidiasis who received/did not receive corticosteroids, and 10 out of 13 (77%) and 2 out of 20 (10%) patients with amoebiasis, respectively.

Conclusions Parasitic colitis poses a diagnostic challenge in high-income settings. Misdiagnosis as IBD is commonly reported, with poor outcomes related to corticosteroid

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Parasitic colitis is highly prevalent worldwide.
⇒ With increasing global travel and migration, parasitic colitis is likely to be encountered in high-income, non-endemic areas more frequently.
⇒ Phenotypic similarity to more prevalent conditions, particularly inflammatory bowel disease (IBD), may leave patients at risk of misdiagnosis and poor outcomes in this setting.
⇒ In high-income settings, the available evidence base is limited to individual case reports, which are yet to be systematically evaluated.

WHAT THIS STUDY ADDS

⇒ We have systematically examined 54 individual presentations of parasitic colitis in high-income settings.
⇒ We highlight a long latency of infection and find that misdiagnosis, particularly as IBD, is commonly reported.
⇒ Misdiagnosis is intrinsically linked to administration of corticosteroids and consequent poor outcomes for patients.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study highlights the importance of physician awareness regarding parasitic aetiologies of colitis, the diagnostic tests and treatments available.
⇒ Affected patients are likely to present via suspected IBD pathways and guidance pertaining to suspected IBD should consider alternative, parasitic aetiologies in at-risk groups.

treatment. Awareness of parasitic colitis aetiologies, at-risk groups and diagnostic tests is essential among generalist clinicians assessing undifferentiated colitis to avoid poor outcomes.

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INTRODUCTION

Intestinal parasitic infections are highly prevalent worldwide and are a common cause of gastrointestinal (GI) symptoms in endemic settings.[1] It is estimated that over 1.5 billion people live with a highly prevalent soil-transmitted helminth infection, such as the roundworm *Ascaris lumbricoides*, the whipworm *Trichuris trichuria* or hookworm.[2 3] It is also estimated that over 600 million people are infected with *Strongyloides stercoralis*, which is a well-recognised cause of colitis.[3 4] A further estimated 2.5 million disability-adjusted life years were attributable to amoebiasis in 2019.[5]

Although the global prevalence of intestinal parasitic infection is high, the geographical distribution of disease is variable. The global distribution of key parasitic infections has been reviewed elsewhere; however, higher prevalence of infection has been consistently associated with tropical climate and poorer provision of water, sanitation and hygiene.[4–7] Intestinal parasitic infections are a leading cause of illness amongst migrants and returning travellers in high-income, non-endemic settings.[8 9] A meta-analysis of 88 studies has reported pooled *S. stercoralis* seroprevalence of 12.2% and pooled schistosomiasis seroprevalence of 18.4% amongst migrants from endemic countries to high-income countries.[9] In 2020, the population of non-European migrants in Europe exceeded 40 million, with the majority migrating from Africa and Asia.[10] Intestinal parasitic infections are therefore likely to be encountered in the high-income setting with increasing frequency.

The complex lifecycles of soil-transmitted helminths including *S. stercoralis* and *Schistosoma* species, and the protozoan *Entamoeba histolytica*, are described in detail elsewhere.[11–13] Infection may be asymptomatic or lead to a range of clinical presentations; however, each of these organisms may cause a colitis with clinical and endoscopic similarities to inflammatory bowel disease (IBD).[11–13]

Individuals with parasitic colitis presenting to healthcare settings in high-income, non-endemic or very low-prevalence settings can pose a diagnostic challenge, especially when presenting to generalist physicians and non-specialist gastroenterologists. Consequently, patients may be misdiagnosed with more prevalent conditions, such as IBD.[14–16] In non-endemic settings, a risk of harm associated with misdiagnosis is of particular concern in patients with intestinal strongyloidiasis and amoebiasis, as corticosteroids and other immunosuppressive treatments used in the management of IBD may cause potentially life-threatening complications including Strongyloides hyperinfection syndrome (SHS) and fulminant amoebic colitis (FAC).[14 17]

Although the prevalence of parasitic colitis in high-income settings is unknown, case reports have highlighted instances of missed and delayed diagnoses, and in some, an association with harm. In the absence of routine reporting of parasitoses in most high-income settings, the available evidence base is limited to individual case reports. Common themes relating to the presentation, diagnosis, management and outcomes of these cases, in settings where the index of suspicion is likely to be low, are yet to be systematically evaluated. These cases merit further study to inform pragmatic recommendations to improve clinical practice, with the aim of improving diagnostic accuracy and minimising patient harm. These findings are of particular relevance to clinicians regularly assessing undifferentiated colitis, that is, physicians outside of infectious disease and tropical medicine units.

The aim of this systematic review is to evaluate the presentation, subsequent management and outcomes of parasitic colitides in high-income, low-prevalence settings. Objectives of the study include the identification of key themes in the presentation and management of this group of patients, including the approach to diagnosis, management strategies employed by clinicians, any difficulties or delays in diagnosis and any patient harm which may have resulted. We aim to evaluate these findings in the context of relevant guidance for clinicians, with the objective of identifying areas where current practice could be improved.

METHODS

Search strategy

A systematic review was conducted using the PubMed and Scopus databases to identify articles published between 1 January 2012 and 10 January 2025. We selected this date range to encompass a large number of cases over a period of time which is reflective of contemporary practice, with access to multiple advanced therapies. Searches were conducted using the search terms shown in online supplemental table 1.

Case reports of undifferentiated colitis presenting in high-income, non-endemic or very low prevalence settings where the aetiological agent was ultimately found to be parasitological were identified in line with the Preferred Reporting Items for Systematic reviews and Meta-analyses (PRISMA) framework (online supplemental material (PRISMA checklist))).[18]

Inclusion and exclusion criteria are provided in box 1. Duplicates were removed following the initial search. No language restrictions were applied to the database searches. All articles were screened by title and abstract independently by authors RDL and CAL, with any discrepancy resolved by consensus. The full text of articles identified for retrieval was independently assessed by authors RDL and CAL according to the described inclusion and exclusion criteria. To ensure relevance of our study to the generalist physician or gastroenterologist, cases presenting to high-income settings within 4 weeks of travel to an endemic setting were excluded as the index of suspicion among clinicians for an infective

Box 1 Inclusion and exclusion criteria for the literature search

Inclusion criteria

⇒ Case report or case series describing an undifferentiated, individual presentation with symptoms of colitis* or incidental findings of colitis in asymptomatic individuals
⇒ Final diagnosis of colitis secondary to a parasitic agent
⇒ Presenting within a high-income setting
⇒ Published between 1 January 2012 and 10 January 2025

Exclusion criteria

⇒ Travel to an endemic setting within 4 weeks of presentation
⇒ Established diagnosis of HIV prior to presentation
⇒ Solid organ or haematological transplant recipients
⇒ Existing diagnosis of parasitic infection prior to the presentation described
⇒ Insufficient information for analysis

*Presentation with colitis defined as symptoms or looser/more frequent stool, or rectal bleeding, or abdominal pain, or weight loss, later confirmed as colitis either radiologically, endoscopically or by histopathological assessment following surgical resection.

agent is likely to be much higher in this cohort with early involvement or referral to infectious disease or tropical medicine specialists. Cases with an established diagnosis of HIV infection prior to presentation, or previous solid organ or haematological transplant, were also excluded as the index of suspicion for an infective agent is also likely to be high in this cohort. A list of articles excluded at the full text screening stage is included in online supplemental table 2.

Synthesis methods

Data were synthesised and presented in line with the synthesis without meta-analysis (SWiM) reporting guideline.[19]

Grouping of studies for synthesis

Included case reports were grouped according to the causative organism described. Within each group, we further classified by timing of parasite-specific investigations (before or after initial diagnosis) and by exposure to corticosteroids. This facilitated a thematic description of key components of the presentation, management and outcomes specific to each organism.

Description of standardised metrics and transformation methods

Key components of each case report were standardised as categorical descriptors including patient demographics, history and timing of exposure, presenting symptoms, investigations employed, exposure to corticosteroids and outcomes. Cases of SHS, FAC, sepsis and emergency surgery were classified as major morbidity.

Description of the synthesis method

A thematic synthesis approach was used. Key themes were identified, including latency, presenting symptoms, investigations, initial diagnosis, treatments employed and outcomes. Tabulation of key study characteristics supported comparison across different causative organisms. Where appropriate, quantitative tallies and percentages were calculated to support the analysis of consistent themes.

Criteria used to prioritise results and investigation of heterogeneity

All included case reports were incorporated into the thematic analysis. Themes prioritised for analysis included those which could be associated with diagnostic error (eg, latency of infection) and poor outcomes (eg, exposure to corticosteroids). We explored heterogeneity by comparing subgroups based on causative organism, timing of parasite-specific investigations and exposure to corticosteroids.

Certainty of evidence

Due to the nature of the evidence appraised, certainty of evidence was not formally assessed. However, the sufficiency and quality of information provided in each case report considered for inclusion was assessed using the Joanna Briggs Institute checklist for case reports.[20] Reports which did not include, as a minimum, a clear presentation of the clinical history, relevant exposures, presenting symptoms, investigations employed and clinical outcomes were excluded (figure 1).

Data presentation methods

Data were presented primarily in narrative text, grouped into key themes. The narrative text has been supplemented by tabulation of study characteristics and graphical representation of outcomes where appropriate.

RESULTS

Study selection

Our search strategy identified 1952 articles following removal of duplicates, of which 52 articles, describing 54 individual cases, were included in the final analysis (figure 1).

Demographics

Fifty-four individual patients with parasitic colitis were included in the final analysis, encompassing 36 male and 18 female patients with an age range of 16–81 years (table 1). Cases were reported in 16 countries, with the most common regions being Europe (30 cases), North America (17 cases) and Australasia (5 cases). Twenty cases occurred in migrants from endemic areas and 18 in returning travellers from an endemic area.

Exposure and causative organism

The cohort contained 33 cases of amoebiasis, 15 cases of strongyloidiasis and 6 cases of schistosomiasis. A history of known exposure in an endemic setting prior to presentation was noted in 35 cases (65%). In six cases (11%), exposure was felt to have occurred within the reporting country. Each of these six cases represented a case of amoebiasis contracted from an infected sexual partner

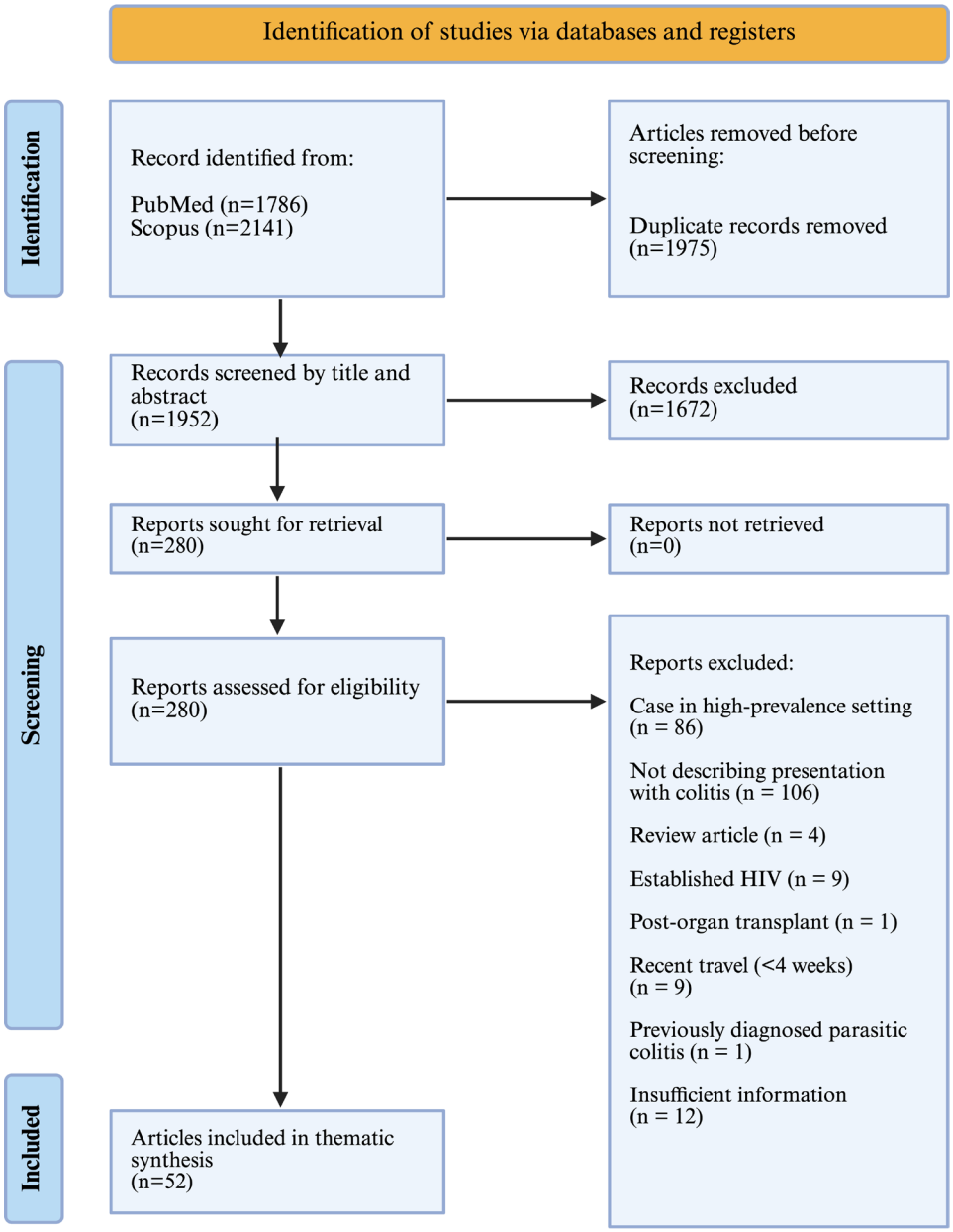

Figure 1 PRISMA (Preferred Reporting Items for Systematic reviews and Meta-analyses) flow diagram of search strategy. Adapted from 'PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only.' Available at: https://www.prisma-statement.org/prisma-2020-flow-diagram. Created in BioRender. Lees, R. (2025). Available at: https://BioRender.com/o06z520.

with a history of travel to an endemic area. In 13 cases (24%), the exposure was unknown or not stated.

Where a history of probable foreign exposure was recorded, the most common regions implicated were South and South-East Asia (11 cases), sub-Saharan Africa (7 cases), South America (4 cases), Central America (4 cases) and the Caribbean (2 cases).

Presentation

The time from last possible exposure to presentation was stated in 26 of 54 cases. The median time from last exposure to presentation was 2 years (range 6 weeks to 35 years), highlighting the long latency of infection in some cases.

The duration of symptoms prior to presentation was stated in 44 of 54 cases. The median duration of symptoms for all cases was 4 months (range 4 days to 11 years). The median duration of symptoms was 4 months in cases of amoebiasis (range 10 days to 11 years), 4.5 months in cases of strongyloidiasis (range 4 days to 10 years) and 3 months in cases of schistosomiasis (range 2 weeks to 11 years). The most common presenting symptoms reported were diarrhoea in 44 of 54 (81%), rectal bleeding in 28 of 54 (52%), abdominal pain in 35 of 54 (65%) and weight loss in 20 of 54 (37%).

Table 1 Case reports identified from the literature search

Study	Age, sex (M/F)	Causative organism	Reporting country	Initial diagnosis	Modality to confirm colitis	Received corticosteroids (yes/no)	Clinical outcome
Basilisco *et al*[43]	54, M	*E. histolytica*	Italy	Amoebiasis	Endoscopy	No	Recovered
Prim *et al*[44]	28, M	*E. histolytica*	Spain	UC	Endoscopy	Yes	Re-presented with FAC, survived
Caetano *et al*[45]	39, M	*E. histolytica*	Portugal	Crohn's disease	Endoscopy	Yes	Re-presented with FAC and liver abscess, survived
Forteza *et al*[46]	33, F	*E. histolytica*	Spain	Thrombotic thrombocytopenic purpura	Pathology (resection specimen)	Yes	Caecal perforation, right hemicolectomy, survived
Mogensen *et al*[47]	66, M	*E. histolytica*	Denmark	UC	Endoscopy	Yes	Developed FAC, survived
Skappak *et al*[48]	24, M	*E. histolytica*	Canada	Amoebiasis	Endoscopy	No	Recovered
	56, M	*E. histolytica*	Canada	Amoebiasis	Endoscopy	No	Concurrent liver abscess, recovered
Grosse[49]	35, F	*E. histolytica*	Switzerland	Amoebiasis with concurrent colorectal cancer	Endoscopy	No	Elective surgery for metastatic adenocarcinoma
Spinzi *et al*[50]	59, M	*E. histolytica*	Italy	Crohn's disease	Endoscopy	Yes	Recovered
Meijer and de Boer[51]	42, M	*E. histolytica*	The Netherlands	Crohn's disease	Endoscopy	No	Recovered
Petridou *et al*[52]	59, M	*E. histolytica*	UK	UC	Endoscopy	Yes	Developed FAC and liver abscess, intubated and ventilated, survived
Vinnamala *et al*[53]	29, M	*E. histolytica*	UK	Crohn's disease	Endoscopy	No	Diagnostic laparoscopy, recovered
Wu and Freiman[54]	66, M	*E. histolytica*	Australia	Not defined	Endoscopy	No	Recovered
de Leijer *et al*[55]	65, M	*E. histolytica*	The Netherlands	IBD/ischaemia	Endoscopy	No	Colonic perforation following colonoscopy, emergency right hemicolectomy, survived
Gravito-Soares *et al*[56]	65, M	*E. histolytica*	Portugal	Amoebiasis	Endoscopy	No	Recovered
Verstockt *et al*[57]	45, F	*E. histolytica*	Belgium	Crohn's disease	Endoscopy	Yes	Re-admitted with severe sepsis and liver abscess, survived
Wallis *et al*[58]	40, F	*E. histolytica*	UK	Inflammatory mass of uncertain aetiology	MRI	No	Re-presented with severe colitis 4 weeks after caecal perforation, survived
Billet *et al*[59]	67, M	*E. histolytica*	France	Infective colitis (not parasitic)	CT	No	Re-presented 6 months later with liver abscess, survived

Continued

Table 1 Continued

Study	Age, sex (M/F)	Causative organism	Reporting country	Initial diagnosis	Modality to confirm colitis	Received corticosteroids (yes/no)	Clinical outcome
Casas Deza *et al*[60]		*E. histolytica*	Spain	Crohn's disease	Endoscopy	Yes	Sepsis and liver abscess, survived
Valdoleiros *et al*[61]	63, M	*E. histolytica*	Portugal	Infective colitis (not parasitic)	CT	No	Concurrent liver abscess, survived
Debourdeau *et al*[62]	49, F	*E. histolytica*	France	Crohn's disease	Endoscopy	Yes	Recovered
Meade *et al*[63]	64, M	*E. histolytica*	UK	Crohn's disease	Endoscopy	No	Concurrent liver abscess, subsequent colonic strictures, elective subtotal colectomy
Parikh *et al*[64]	67, M	*E. histolytica*	Australia	Amoebiasis	Endoscopy	No	Recovered
Fabián *et al*[65]	53, F	*E. histolytica*	Czechia	Unspecified colitis	Endoscopy	No	Recovered. Diagnosed 3 years after initial presentation
Wang and Kanthan[24]	49, M	*E. histolytica*	Canada	Crohn's disease	Endoscopy	Yes	Multiple colonic perforations, total colectomy followed by multiple small bowel resections, died
Abasszade *et al*[66]	36, F	*E. histolytica*	Australia	UC	Endoscopy	Yes	Re-presented with severe colitis, survived
	45, M	*E. histolytica*	Australia	Crohn's disease	Endoscopy	Yes	Sigmoid perforation, Hartmann's procedure, survived
De Somer *et al*[67]	46, F	*E. histolytica*	Belgium	Crohn's disease	Endoscopy	No	Recovered
Qureshi *et al*[68]	48, M	*E. histolytica*	USA	Amoebiasis	Endoscopy	No	Concurrent liver abscess, recovered
Griemert *et al*[69]	53, M	*E. histolytica*	Germany	Crohn's disease	Endoscopy	Yes	Recovered. Managed as Crohn's disease for approximately 1 year
Honap and Anderson[70]	32, M	*E. histolytica*	UK	UC	Endoscopy	No	Recovered. Managed as UC for 9 years
De Francesco *et al*[71]	37, F	*E. histolytica*	Italy	Amoebiasis	Endoscopy	No	Concurrent liver abscess, recovered
Waheed and Raman[72]	66, M	*E. histolytica*	UK	Amoebiasis	Endoscopy	No	Recovered
Boscá Watts *et al*[73]	41, M	*S. stercoralis*	Spain	Crohn's disease	Endoscopy	Yes	Developed SIADH, recovered

Continued

Table 1 Continued

Study	Age, sex (M/F)	Causative organism	Reporting country	Initial diagnosis	Modality to confirm colitis	Received corticosteroids (yes/no)	Clinical outcome
Catalano *et al*[74]	47, M	*S. stercoralis*	USA	Strongyloidiasis	Endoscopy	No	Elective right hemicolectomy for concurrent colorectal cancer
Dahal *et al*[75]	59, F	*S. stercoralis*	USA	Infective colitis (not parasitic)	CT	Yes	SHS and *E. coli* meningitis, died
Poveda *et al*[25]	64, F	*S. stercoralis*	USA	UC	Endoscopy	Yes	SHS, died
Konecny *et al*[76]	27, M	*S. stercoralis*	Australia	Crohn's disease	Endoscopy	Yes	SHS, defunctioning ileostomy, died
Tam *et al*[28]	55, M	*S. stercoralis*	Canada	Crohn's disease	Endoscopy	Yes	SHS, died
Gao and Matta[77]	30, F	*S. stercoralis*	USA	Bowel obstruction of uncertain aetiology	Endoscopy	No	Multiple emergency laparotomies, survived
Lowe *et al*[78]	44, M	*S. stercoralis*	USA	Strongyloidiasis	Endoscopy	No	Episode of meningitis, survived
Paleti *et al*[79]	54, M	*S. stercoralis*	USA	Strongyloidiasis	Endoscopy	No	Recovered
Sava *et al*[80]	70, F	*S. stercoralis*	USA	Strongyloidiasis and colorectal cancer	Endoscopy	No	Elective right hemi-colectomy for colorectal cancer, survived
Santos Rancaño *et al*[81]	16, F	*S. stercoralis*	Spain	UC	Endoscopy	Yes	SHS, colonic perforation, right hemicolectomy and ileostomy, survived
Grossman *et al*[82]	70, M	*S. stercoralis*	USA	Rheumatological/ oncological process	CT	Yes	SHS, sepsis, died
Saqib *et al*[83]	ns, M	*S. stercoralis*	UK	Crohn's disease	Endoscopy	Yes	SHS, sepsis, died
Yousaf *et al*[84]	81, M	*S. stercoralis*	USA	Infective colitis	Endoscopy	No	Recovered
Raheel *et al*[85]	64, F	*S. stercoralis*	Canada	UC	Endoscopy	No	Recovered
Bagdure and Khasawneh[86]	29, F	*Schistosoma* spp	USA	Schistosomiasis	Endoscopy	No	Recovered
Branco *et al*[87]	33, F	*S. intercalatum*	Portugal	Schistosomiasis	Endoscopy	No	Recovered
Greer *et al*[88]	26, M	*S. mansoni*	USA	Schistosomiasis	Endoscopy	No	Recovered
Shahzad *et al*[89]	62, M	*S. mansoni*	UK	Schistosomiasis	Endoscopy	No	Recovered
Ak *et al*[90]	26, M	mansoni	Türkiye	UC	Endoscopy	No	Recovered
Chen *et al*[91]	50, F	*Schistosoma* spp.	Singapore	UC	Endoscopy	Yes	Recovered

E. coli, *Escherichia coli*; *E. histolytica*, *Entamoeba histolytica*; FAC, fulminant amoebic colitis; IBD, inflammatory bowel disease; ns, not stated; SHS, Strongyloides hyperinfection syndrome; SIADH, syndrome of inappropriate anti-diuretic hormone secretion; *S. stercoralis*, *Strongyloides stercoralis*; UC, ulcerative colitis.

Investigation

Eosinophilia

A blood eosinophil count was documented in 24 of 54 cases. Where an eosinophil count was recorded, it was elevated above the local laboratory reference range in 11 of 24 cases (46%).

Where data were available, an eosinophil count was elevated above the reference range in 2 of 9 cases (22%) of amoebiasis, 7 of 12 cases (58%) of strongyloidiasis and 2 of 3 cases (67%) of schistosomiasis.

Serology and stool microscopy

The relevant serological test was reported as performed in 19 of 54 cases (35%), with a positive result in 18 of 19 instances (95%).

There was documentation of stool microscopy being performed on at least one stool sample, at any stage, in 31 of 54 cases (57%). In four cases, there was clear documentation of more than one sample being sent for microscopy, in 7 cases one sample was sent, and in the remaining 20 cases, the number of stool samples sent for microscopy was not stated or was unclear. When stool microscopy was performed, the result was positive for *Entamoeba histolytica/dispar* in 7 of 17 cases (41%) of amoebiasis. Stool PCR testing was performed in four cases of amoebiasis, which was positive in all cases.

Stool microscopy was performed in nine cases of strongyloidiasis and the result was positive in seven of nine cases (78%).

Stool microscopy was performed in three of six cases of schistosomiasis with a negative result recorded in all cases.

Endoscopy and pathology

48 of 54 patients (89%) underwent lower GI endoscopy with macroscopic evidence of colitis in all cases. A further 5 of 54 cases (9%) had radiological evidence of colitis and in one case (2%) colitis was diagnosed on pathological examination of a colonic resection specimen.

Description of the endoscopic appearance of the colon was highly variable across all aetiologies. Across the 30 cases of amoebiasis which underwent lower GI endoscopy, ulceration was frequently described but was not universal. 24 of 30 (80%) described a non-continuous distribution, 6 of 30 (20%) a pan-colonic disease, 12 of 30 (40%) right-sided inflammation only and 5 of 30 (17%) described proctitis/proctosigmoiditis. Descriptions of strongyloidiasis and schistosomiasis were similarly variable, with both continuous and non-continuous distributions of inflammation described.

When histopathological examination of colonic tissue (either biopsy samples or resection specimens) was performed, the causative organism was identified on the initial pathological examination in 15 out of 30 cases (50%) of amoebiasis, 7 of 13 cases (54%) of strongyloidiasis and 5 of 6 cases (83%) of schistosomiasis.

Diagnosis

37 of 54 cases (69%) were initially misdiagnosed or no clear diagnosis was stated. Of these, 28 out of 37 (76%) were initially misdiagnosed as IBD (16 Crohn's disease, 10 ulcerative colitis (UC), 2 IBD unclassified).

A correct initial diagnosis was associated with stool studies and/or serological testing being performed early. Nine of 17 (53%) patients who received a correct initial diagnosis had documentation of stool studies and/or serological testing prior to diagnosis, in contrast to 7 of 37 (19%) cases which were misdiagnosed.

The final method of diagnosis was pathological examination of colonic biopsies or resection specimens in 38 of 54 cases (70%). This included two cases where the causative parasite was identified at post-mortem examination. In 37 of these 38 cases, serological testing was not performed, or performed after the diagnosis had been established by pathology.

The final (correct) diagnosis was made on the basis of positive stool microscopy or stool PCR result in a further 12 of 54 cases (22%), and the correct diagnosis was established on the basis of a positive serological test result in 4 of 54 cases (7%).

Corticosteroids and immunosuppression

25 of 54 patients (46%) were administered corticosteroids at any point during their presentation. In 23 of 25 cases (92%), corticosteroid administration followed misdiagnosis, with 21 of these 25 (84%) patients receiving a misdiagnosis of IBD. One patient presented following a short course of steroids for concurrent thrombotic thrombocytopenic purpura and another patient presented following a recent increase in prednisolone dose for concurrent rheumatoid arthritis.

13 of 33 cases (39%) of amoebiasis received corticosteroids. In 12 cases, this followed misdiagnosis as IBD. Six cases who received corticosteroids also received additional immunosuppression; one patient received infliximab, one patient received adalimumab, one patient received azathioprine, one patient received adalimumab and ustekinumab, and one patient received infliximab, vedolizumab and ustekinumab at different time points. A further case of amoebiasis did not receive corticosteroids but was prescribed azathioprine and adalimumab for presumed UC.

Nine of 15 cases (60%) of strongyloidiasis received corticosteroids. This followed misdiagnosis as IBD in six cases. In addition to corticosteroids, one patient received azathioprine, one patient received infliximab and one patient received methotrexate and abatacept.

Outcomes

Of the 54 case studies included in this study, 21 patients experienced major morbidity, defined as one or more of SHS, FAC, sepsis and/or emergency surgery, or mortality (figure 2). This included 12 cases of severe/'fulminant' colitis and eight cases of disseminated strongyloidiasis.

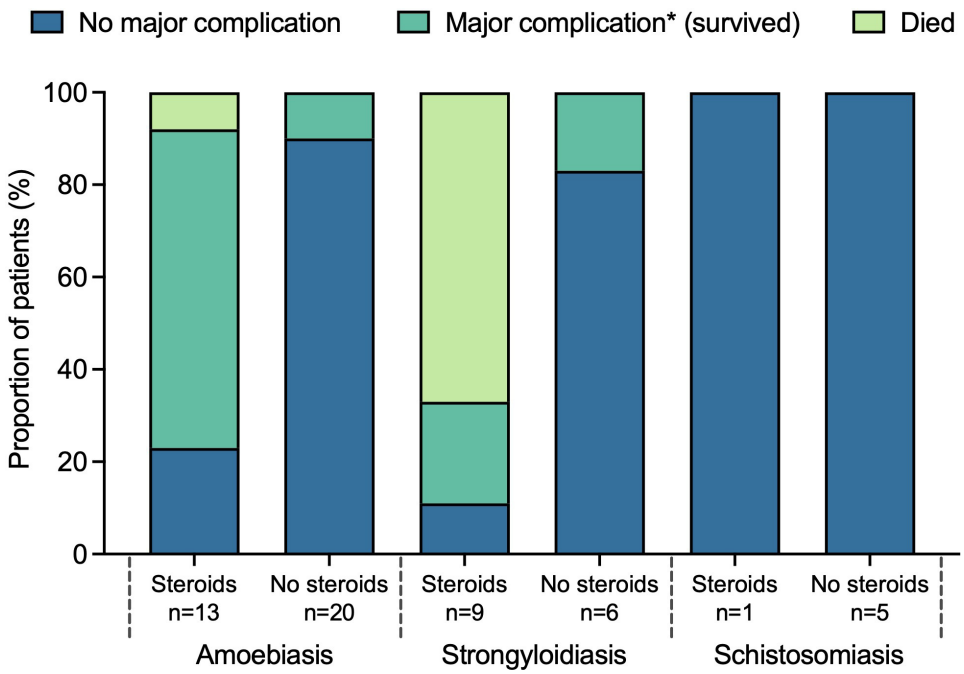

Figure 2 Patient outcomes stratified according to corticosteroid exposure for amoebiasis (n=33), strongyloidiasis (n=15) and schistosomiasis (n=6). *Major complication defined as Strongyloides hyperinfection syndrome, fulminant amoebic colitis, emergency surgery or sepsis.

There were six cases of colonic perforation and in seven instances the patient died.

Other morbidity included concurrent liver abscess in 10 patients and concurrent colorectal cancer in 3 patients (table 1).

Outcomes associated with corticosteroids

Although two of six cases of schistosomiasis were misdiagnosed initially with UC, no significant morbidity was recorded within this cohort. One patient received corticosteroids.

Twenty patients with amoebiasis did not receive corticosteroids. One patient (5%) within this cohort developed FAC. Five of the 20 patients (25%) underwent surgery. Two of 20 patients (10%) underwent emergency surgery following colonic perforation and one case underwent elective surgery for concurrent colorectal cancer. One patient underwent elective colectomy for colonic strictures following amoebiasis and one patient underwent diagnostic laparoscopy. There were no deaths within the group unexposed to corticosteroids.

Thirteen patients with amoebiasis did receive corticosteroids, including 12 patients for misdiagnosed IBD (92%). Of this cohort, 10 of 13 patients (77%) developed FAC or severe sepsis. Three of 13 (23%) underwent emergency surgery, which followed colonic perforation in all cases. One patient (one of 13, 8%) died.

Six patients with strongyloidiasis did not receive corticosteroids. No patients within this cohort developed SHS, although three of six (50%) underwent surgery. Two patients underwent elective surgery for concurrent colorectal cancer, and one of six (17%) underwent emergency surgery for small bowel obstruction. There were no deaths within the group unexposed to corticosteroids.

Nine patients with strongyloidiasis received corticosteroids, including eight patients for a misdiagnosis of IBD (89%). Eight of nine patients (89%) developed SHS and disseminated disease. Two of nine patients (22%) underwent emergency surgery, and six of nine patients (67%) died.

Outcomes associated with biologics and immunomodulators

Nine patients received biologics or immunomodulators. Due to low numbers of patients receiving each medication and concurrent prescription of corticosteroids in most cases, independent appraisal of harm for these agents was not possible (online supplemental table 3).

DISCUSSION

To our knowledge, we have undertaken the first systematic review of undifferentiated colitis presenting in high-income settings later confirmed as parasitic colitis endoscopically, radiologically and/or by histopathology. Our review highlights common pitfalls leading to misdiagnosis, including a low index of suspicion, a lack of physician awareness of disease pathobiology and at-risk groups, compounded by long latency of infection (figure 3). In turn, this leads to diagnostic error, with limited use of parasite-specific investigations and frequently reported misdiagnosis of IBD. We identify inappropriate administration of corticosteroids which may lead to substantial iatrogenic harm and death.

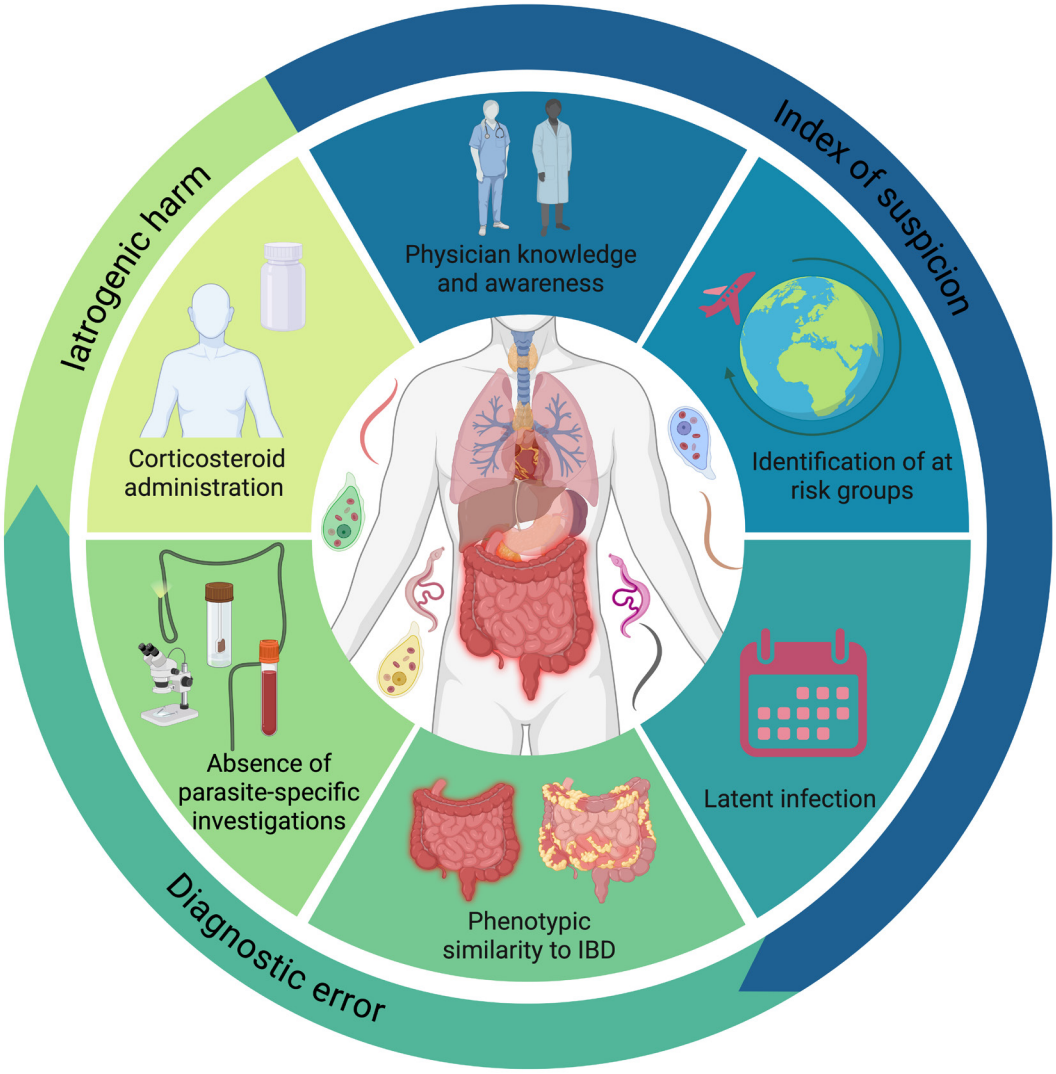

Figure 3 Common pitfalls in the diagnosis and management of parasitic colitis. Key contributory factors and decision points which lead to misdiagnosis and patient harm. Created in BioRender. Lees, R. (2025). Available at: https://BioRender.com/p873yhw.

An appraisal of the management of parasitic colitis in high-income settings is both warranted and timely. First, sustained growth in international travel and migration means that the population at risk in this setting is increasing.[21] Existing evidence suggests that when screened for, parasitic infections are prevalent among high-risk groups presenting with GI symptoms.[22 23] Second, repeated reports of misdiagnosis and poor outcomes suggest that the management of this cohort of patients could be improved.[24 25]

Reducing diagnostic error

A high index of suspicion is central to accurately diagnosing parasitic colitis in non-endemic settings. However, frequent reporting of late or absent utilisation of parasite-specific investigations suggests a low index of suspicion among clinicians. Several factors may contribute to this phenomenon. First, previous studies have suggested that knowledge and awareness of intestinal parasites and relevant investigations is poor among non-infectious disease specialists in non-endemic settings.[26 27] Second, long latent periods between exposure and presentation are likely to contribute to a low index of suspicion.[28] Nevertheless, a history of potential foreign exposure, or potential exposure in a sexual contact, was reported in 76% of cases and was available to clinicians if they sought the information. This study suggests that even remote historical exposure should be considered significant; however, the available evidence suggests that a travel history is rarely taken in practice.[29 30]

We have also highlighted six cases of sexually transmitted amoebiasis, an issue which has been recently reviewed.[16] Sexual transmission of *E. histolytica* is well recognised, particularly between men who have sex with men.[16 31–33] In the high-income setting, clinicians should therefore consider that exposure in an endemic setting may have occurred in a sexual partner rather than the symptomatic patient.

Finally, the high prevalence of IBD and the similarity in phenotype of these conditions are likely to contribute to diagnostic error. Among the cases identified in this study, the most common presenting symptoms were diarrhoea, abdominal pain, rectal bleeding and weight loss. In practice, such patients are highly likely to be referred to a gastroenterologist to consider a diagnosis of IBD.

Published guidelines, particularly those addressing the assessment of suspected IBD, present an attractive opportunity both to increase awareness among clinicians who may not be familiar with parasitic infections and to standardise practice. The latest iteration of the British Society of Gastroenterology (BSG) IBD guidelines states that stool microscopy for *E. histolytica* should be undertaken in those with '*relevant travel history*'.[34] The BSG guidelines also suggest that those with a history of potential exposure may have *Strongyloides* serology and eosinophil count checked prior to commencing anti-tumour necrosis factor (TNF) therapy.[34] European Crohn's and Colitis Organisation guidance only considers strongyloidiasis specifically and recommends that, in the context of IBD, '*If travel history is suggestive, stool examination for ova, cysts and parasites and Strongyloides serology should be performed before therapy is escalated*'.[35]

Our findings suggest, however, that limiting suspicion to those with a history of recent travel, or limiting testing to a single organism, is likely to result in cases being missed, potentially with catastrophic consequences. Furthermore, limiting screening to patients who plan to commence anti-TNF therapy, which is often used *after* administration of corticosteroids, risks intervening too late to prevent significant harm. Guidelines could therefore be much more explicit in stating first, that a travel history is essential in the assessment of suspected IBD

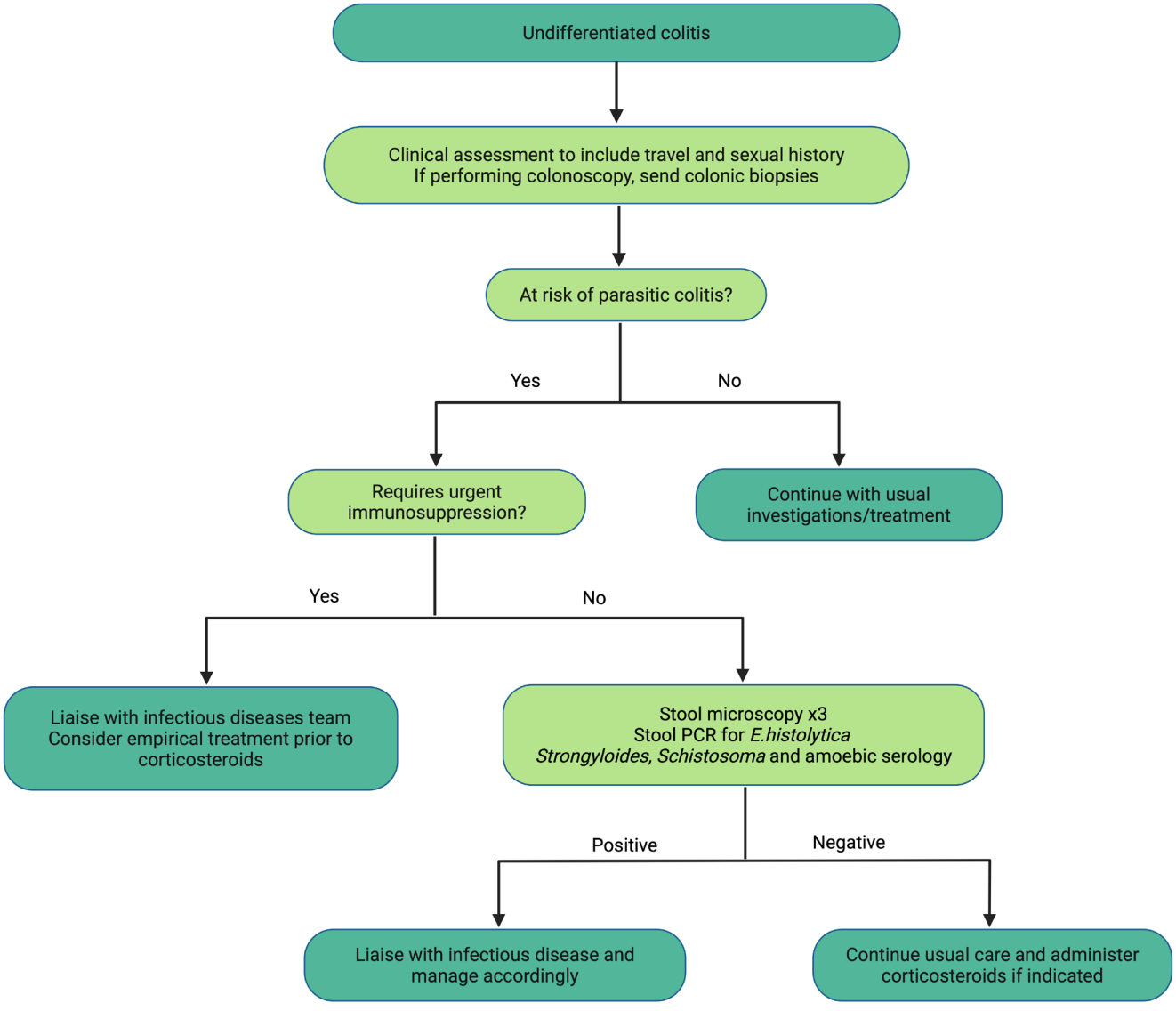

Figure 4 A diagnostic approach to undifferentiated colitis in high-income settings. Created in BioRender. Lees, R. (2025). Available at: https://BioRender.com/7v21960.

Box 2 Ten learning points to improve diagnosis and patient outcomes from parasitic colitis in high-income settings

1. Returning travellers and migrants are at risk of parasitic colitis.
2. A history of exposure in an endemic setting, including via a sexual contact, is present in most cases.
3. There may be a long latency of infection.
4. Peripheral eosinophilia is common but not always present.
5. Parasite-specific serological tests are highly sensitive and a correct diagnosis is more likely if these are performed early.
6. Stool microscopy should be performed, but sensitivity is poor. Stool PCR for *Entamoeba histolytica* should be performed where the index of suspicion remains high in collaboration with microbiology/infectious disease specialist colleagues.
7. Lower GI endoscopy is likely to demonstrate macroscopic colitis, but features are variable.
8. Colonic biopsies should be taken and may reveal the causative organism.
9. Misdiagnosis is frequently reported, particularly as IBD.
10. Corticosteroid use in strongyloidiasis and amoebiasis is associated with high morbidity and mortality but not in schistosomiasis.

IBD, inflammatory bowel disease.

and should consider historical exposures to be significant, and second, that clinicians should consider diagnoses of strongyloidiasis, amoebiasis and schistosomiasis specifically in at-risk patients.

An approach to treatment

A significant proportion of the cases identified in this study experienced poor outcomes. The association between corticosteroids and poor outcomes in strongyloidiasis and amoebiasis is well established in endemic settings, with a similar association observed in this study.[14 36] In contrast, outcomes were much more favourable in those who did not receive corticosteroids, even if the initial diagnosis was incorrect, with no deaths reported in this group. These results suggest, therefore, that while misdiagnosis may lead to delays to effective treatment, significant harm is unlikely unless misdiagnosis is linked to use of corticosteroids.

Screening for infectious agents is already established practice in IBD prior to administration of advanced therapies.[34] In practice, however, these medications are often used after corticosteroids, which remain in common usage.[37] To prevent the poor outcomes associated with corticosteroids, it follows that screening in suspected cases should take place prior to corticosteroid administration wherever possible. In this scenario, the available evidence supports utilising a combination of concentrated stool microscopy (on at least three samples) and serological tests when testing for helminths.[38 39] Although stool microscopy is of limited utility in detecting *E. histolytica*, a combination of serological testing and stool PCR offers a sensitive means of diagnosis in high-income settings.[40 41] A combination of eosinophil count and stool microscopy (as advocated in the BSG IBD guidelines) is not considered sufficiently sensitive.[34 38 39] In cases where administration of corticosteroids cannot be delayed, it may be reasonable to consider empirical treatment for high-risk pathogens (ie, *S. stercoralis* and/or *E. histolytica*). The caveat to this approach is that ivermectin, for treatment of strongyloidiasis, cannot be administered empirically to individuals at risk of loiasis, which is endemic to areas of West and Central Africa, due to the risk of inducing a potentially fatal encephalopathy in those with high microfilarial loads.[42] We have summarised a suggested approach to the investigation of suspected cases in figure 4.

Limitations and future work

It is acknowledged that the true prevalence of parasitic colitis in high-income countries remains unknown, with the cases identified here inevitably representing a minority of presentations. Due to reporting bias, it is acknowledged that the 54 case reports included in this study are not necessarily representative of the clinical course of all cases of parasitic colitis. An assessment of the burden of disease in these settings is hampered by a lack of regular screening and the absence of notifiable disease data, with the exception of *E. histolytica* in the UK.

Determining the prevalence of parasitic infection amongst individuals with colitis who are at risk of infection should be a focus of future research. Existing evidence suggests that rates of seropositivity are high in at-risk groups. For instance, one UK study screening South-Asian migrants with eosinophilia or GI symptoms revealed a seroprevalence for *S. stercoralis* of 33.6% and 16.4%, respectively.[23]

Additionally, the cases of misdiagnosis and patient harm identified in this study suggest that screening should be undertaken with greater frequency within routine clinical care, including the addition of *E. histolytica* PCR to 'routine' PCR panels. Updating existing guidance to support early screening of at-risk groups would identify additional cases, prevent many of the instances of patient harm identified in this study and would also generate an evidence base for further study of the prevalence of symptomatic disease and management of this cohort of patients.

CONCLUSIONS

Trends in international travel and migration are likely to result in cases of parasitic colitis presenting with increasing frequency in the high-income, non-endemic setting. A low index of suspicion amongst clinicians, long latency of infection and phenotypic similarity to IBD can result in parasitic colitis presenting a unique diagnostic challenge to the clinician. Misdiagnosis is commonly reported, and the consequences of this are potentially life-threatening for the individuals involved. The necessary diagnostic tools are available to clinicians to improve diagnostic accuracy and prevent patient harm; however,

increasing awareness among clinicians, particularly those who frequently assess undifferentiated colitis, is essential to improving outcomes. We propose 10 key learning points that may help to improve diagnosis and patient outcomes in high-income settings (box 2). Evaluating the prevalence of parasitic colitis in at-risk groups should be a focus of future research; however, the evidence presented here of significant and ongoing patient harm should act to improve awareness of this presentation and to prompt a change in practice.

Author affiliations
[1]Translational and Clinical Research Institute, Newcastle University, Newcastle upon Tyne, UK
[2]Department of Gastroenterology, Newcastle Upon Tyne Hospitals NHS Foundation Trust, Newcastle upon Tyne, UK
[3]Biomedical Sciences, The University of Edinburgh, Edinburgh, UK
[4]Population Health Sciences Institute, Newcastle University, Newcastle upon Tyne, UK
[5]Dept Gastroenterology, St George's University Hospitals NHS Foundation Trust, London, UK
[6]Institute for Infection and Immunity, St George's University of London, London, UK

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ORCID iDs
Robert D Lees https://orcid.org/0009-0003-7439-1681
Laura M Woods https://orcid.org/0000-0002-2178-1577
R Alexander Speight https://orcid.org/0000-0003-3184-9181
Richard C G Pollok https://orcid.org/0000-0001-6452-6763
Christopher A Lamb https://orcid.org/0000-0002-7271-4956

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