CASE REPORT

Complex Interplay: Irritable Bowel Syndrome and the Incidental Discovery of Malrotated Kidney

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ABSTRACT

Background

Irritable Bowel Syndrome (IBS) a functional gastrointestinal disorder that, when combined with Iron Deficiency Anaemia (IDA), greatly impacts one's quality of life. This case study explores the challenges involved in diagnosing and treating a patient with IBS, IDA, anda renal anatomical anomaly.

Case Presentation

A 29-year-old Saudi woman came in with symptoms suggesting IBS and ongoing IDA despite taking iron supplements. Her medical history revealed a disc prolapse, but there were no signs of gastrointestinal bleedings or dietary deficiencies that could account for the anaemia. During a diagnostic imaging procedure, a malrotated kidney was unexpectedly discovered.

Investigations

Diagnostic criteria from Rome IV were utilised for diagnosing IBS. The laboratory results indicated IDA,and a CT scan verified the renal abnormality. The management plan involved making dietary adjustments to address IBS and improve iron absorption. Medications were used to alleviate abdominal pain, and both oral and intravenous iron treatments were administered for IDA. The potential impact of the rotated kidney on the patient's symptoms and anaemia was taken into account, necessitating continuous assessment.

Conclusion

The case emphasises the significance of taking a comprehensive, interdisciplinary approach when dealing with patientswho have intricate gastroenterological symptoms, especially when there are accompanying anatomical irregularities. Furthermore, it highlights the importance of accurate diagnostic methods to identify root causes that may impact the management and outlook of IBS and IDA.

Keywords

Irritable Bowel Syndrome, Iron Deficiency Anemia, Malrotated Kidney, Chronic Inflammation, Multidisciplinary Approach, Intravenous Iron Therapy

INTRODUCTION

One prevalent functional gastrointestinal condition that has a major impact on people's quality of life and ability to function socially is irritable bowel syndrome (IBS) (1,2). Approximately 5–10% of the world'spopulation suffers from irritable bowel syndrome, which is defined by recurring stomach pain along with changes in the consistency or frequency of bowel movements (3). Despite the lack of clarity around the aetiology of irritable bowel syndrome, the main goals of treatment are therelief of abdominal discomfort and the regulation of bowel habits, with a focus on the symptoms that cause the greatest distress(4). Soluble fibre, antispasmodic medicine, and dietary modifications are the usual first lines of defence (5). Patients experiencing severe symptoms may be prescribed a variety of drugs, including intestinal secretagogues, low-dose tricyclic antidepressants, pharmaceuticals that target opioid or 5-HT receptors, avoidance of fermented foods, andpsychiatric therapy (6). Annual expenses in Europe can reach €8 billion, in China ¥123 billion, and the USA above $10 billion, indicating that IBS has a significant impact on the economy (1,5).

The current diagnostic criteria for irritable bowel syndrome (IBS) based on symptoms are the Rome IV criteria, which were created by consensus among experts (6). Constipation or altered bowel habits that persist for six months or longer is consideredirritable bowel syndrome according to these criteria (7). Based on their primary stool patterns, patients with irritable

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bowel syndrome (IBS) can be further divided into four groups: IBS with diarrhoea, IBS with constipation, IBS with mixed stool patterns, and IBS unclassified (8). Women are more likely than males to suffer from irritable bowel syndrome (IBS), and the frequency is lower among those aged 50 and over, according to the research (7). Fibromyalgia, chronic tiredness, and other functional somatic disorders are associated with an increased risk of irritable bowel syndrome (IBS) (5). abnormalities in the enteric neural system can impact gastrointestinal motor, sensory, mucosal barrier, and secretory functions. The biopsychosocial model implies that genetic predisposition, early life adverse experiences, psychological variables, and gastrointestinal infections are potential causes of these abnormalities (9).

Iron deficiency anaemia (IDA) affects a large number of people and can have serious consequences for those who suffer from gastrointestinal issues, such as irritable bowel syndrome (IBS). (10 Iron deficiency anaemia affects around 30% of the world's population,according to the World Health Organisation. Unfortunately, it is typically poorly treated within the framework of gastrointestinal disorders (11). Along with diarrhoea and abdominal discomfort, anaemia is a common symptom of irritable bowel syndrome (IBS) and can worsen chronic tiredness (12). In irritable bowel syndrome, iron deficiency and, less often, cobalamin or folateinsufficiency are the main reasons of anaemia(13).

Unfortunately, oxidative stress at inflammatory sites in the intestines, poor absorption, and intolerance are common problems with oral iron therapy for IDA (14). But there is good news: intravenous iron sucrose improves quality of life, has a 65- 75% response rate after 4-8 weeks, and has a favourable safety profile (15). A combination of oral or intravenous iron supplementation, dietary changes to enhance iron intake, and treating any underlying causes of blood loss or malabsorption is advised for the management of anaemia in individuals with irritable bowel syndrome (IBS) (16). Erythropoietin (EPO) is not a widely recommended treatment option for IBS- associated anemia, as the relationship between the two conditions remains unclear (17).

The clinical presentation and laboratory findings of the case led to a diagnosis of IBS, necessitating a comprehensive management plan that includes dietary modifications, antispasmodic medications, and continued iron replacement therapy. This case highlights the complexities and interrelationships between IBS and IDA, underscoring the need for a multidisciplinary approach to treatment.

Case Presentation

A 29-year-old Saudi female presented to Imam Medical Centre in Riyadh, Saudi Arabia, with a chief complaint of recurrent left lower abdominal pain. The pain was described as colicky, intermittent, and radiated to the peri-umbilical area. The patient denied any urinary symptoms, including dysuria, hematuria, urgency, incontinence, or frequency. Additionally, she reported no diarrhea, constipation, melena, orany other alarming gastrointestinal symptoms.

Medical History

The patient's medical history included:

Iron Deficiency Anemia: Despite a two- month course of oral iron therapy, her anemia persisted, necessitating intravenous iron administration.

Cervical and Lower Back Disc Prolapse: Thepatient had a history of disc prolapse in the cervical and lumbar regions, contributing to chronic pain.

Symptoms

The patient also experienced episodes of dizziness and palpitations. However, she denied having any seizures, syncope, abnormal movements, tongue biting, or loss of sphincter control. There was no known history of allergies.

Obstetric and Gynecologic History

She had menarche by 12 years with normalmenstrual cycle and no menorrhagia.

Single patient sexually inactive.

Family and Social History

Her family history was significant for breast cancer in her grandmother. Socially, she was single, had a good socioeconomic status, andhad no history of smoking or alcohol use.

Physical Examination

Vital Signs: The patient was vitally stable with a regular pulse.

Cardiac Examination: Normal first and second heart sounds were heard, with noadditional sounds.

Abdominal Examination: The abdomen was soft and

lax, with no tenderness or organomegaly detected.

Laboratory Investigations

- Serum Creatinine: 64 µmol/L
- Serum Potassium: 3.91 mmol/L
- Serum Sodium: 139 mmol/L
- Hemoglobin: 10.3 g/dL (indicatingmicrocytic and hypochromic anemia)
- Ferritin: 14.6 ng/mL
- Urine Analysis: Negative for blood and protein, with zero red blood cells
- Serological work for Celiac disease is negative

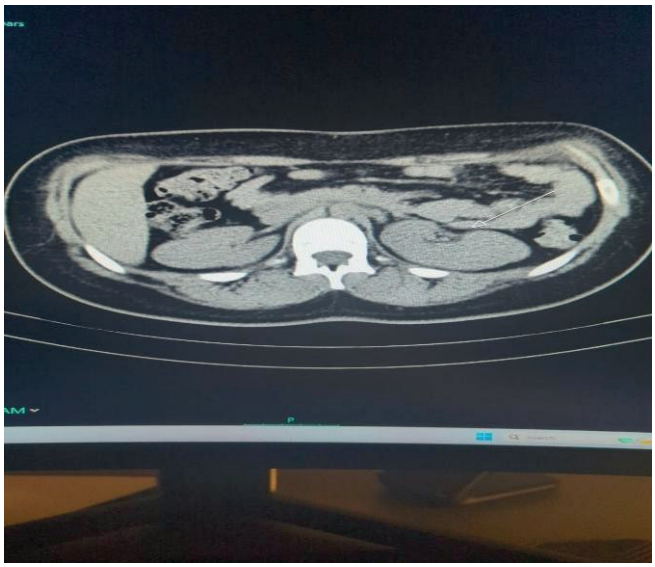
Based on the clinical presentation and investigation results, a diagnosis of irritable bowel syndrome (IBS) was made. The patient was advised to continue with symptomatic management for IBS, which included dietary modifications, antispasmodic medications, and continued iron replacement therapy for her anemia.

Radiological Findings

During a subsequent visit, a CT scan of the abdomen and pelvis was advised to check forany other abdominal pathology.

CT Scan Findings

The CT scan incidentally revealed a malrotated kidney. This anatomical anomalywas unexpected and warranted further evaluation to understand its clinical significance.



Relationship Between Malrotated Kidney and Abdominal Pain A malrotated kidney can be asymptomatic however, it is not uncommon for such anatomical anomalies to cause symptoms, particularly abdominal pain. In this patient, the left lower abdominal pain, which radiatedto the peri-umbilical area, could be attributedto the malrotated kidney. The pain mightresult from hydronephrosis and increased pressure within the kidney due to obstruction at the ureteropelvic junction, vascular abnormalities and twisting/stretching of the renal blood vessels, and compression or irritation of surrounding structures like nerves and organs(18,19). Additionally, malrotated kidneys have a higher incidence of complications like urolithiasis andinfection due to stasis, which can also contribute to abdominal discomfort (19,20). Malrotated kidneys are more susceptible to stone formation due to impaired urinary drainage, which can also cause significant pain (20).

Relationship Between Malrotated Kidney and Anemia

Iron deficiency anemia (IDA) is a common consequence of various gastrointestinal disorders, including IBS. Despite its significant impact on patients' quality of life (QoL), it is often under-recognized and inadequately managed (13). Although modern medicine has a substantial understanding of the pathophysiology of anemia and IDA, and a range of effective treatments are available, there remain pertinent issues regarding optimal management strategies.(16) When it comes to iron supplementation, the European Crohn's and Colitis Organisation (ECCO) suggests tailoring it to each patient's specific needs. In certain circumstances, parenteral iron may be better than oral iron because of its safety profile and effectiveness, whereas the latter can have adverse effects (21).

The average person loses 1-2 mg of iron each day and must make up for it through food. Heme iron, found in foods like meat, poultry, and fish, and non-heme iron, found in plants, are the two main sources of iron in a healthy diet (14,22). A number of chemicals, including stomach acid, ascorbic acid, phytic acid, and polyphenols in vegetables, can limit the absorption of non- heme iron (10.23). After myoglobin is mechanically and enzymatically digested, heme iron is liberated (5,24). Dietary iron intake can be negatively impacted in irritablebowel syndrome (IBS) patients due to food aversions and self-reported intolerances. This is particularly true for women with IBS who avoid high-fiber meals out of anxiety that their symptoms would worsen (9,25). Chronic gastrointestinal issues in IBS may lead to a negative iron balance due to these dietary restrictions.

The only natural pathways for iron loss are menstrual and intestinal bleeding. In IBS, chronic gastrointestinal issues can significantly surpass the dietary iron absorption, resulting in a negative iron balance. While iron absorption is typically normal in IBS, it can be impaired in cases where gastrointestinal disturbances affect the absorption process (13). This impaired absorption exacerbates the problem of IDA in IBS patients, further complicating their treatment and management.

Hypochromic and microcytic red blood cells occur when haemoglobin synthesis is hindered because of an iron deficit that does not adequately supply erythroblasts during development. Ineffective erythropoiesis results from the erythropoietin (Epo) response to low haemoglobin levels, which triggers erythropoiesis and increases the demand for iron beyond what can be supplied (22). Given the prevalence of dietary limitations and gastrointestinal symptoms in the setting of irritable bowel syndrome (IBS), this phenomenon highlights the need for efficient solutions for iron supplementation. Many studies have shown that IDA is common and has a significant influence on people with irritable bowel syndrome. For example, despite the fact that anaemia has a major influence on the quality of life of IBS patients, research has demonstrated that it is frequently disregarded (23). Effective iron supplementation, especially intravenous forms, has been shown to significantly improve hemoglobin levels and overall patient well-being (10). The relationship between kidney anomalies and anemia, particularly chronic disease anemia, warrants consideration. Chronic conditions, including renal anomalies, can contribute to anemia through mechanisms such as inflammation and altered erythropoietin production. Although chronic kidney disease is the more common association, it is worth exploring the potential impact of a malrotated kidney on anemia (24). The kidneys play a crucial role in erythropoietin production, which stimulates red blood cell production(25).

A malrotated kidney might have altered function, potentially affecting erythropoietin levels and contributing to anemia. Furthermore, chronic low-grade inflammation associated with a malrotated kidney could contribute to anemia of chronic disease. Considering the complexity and interrelation between IBS and IDA, and the potential role of renal anomalies, a multidisciplinary approach is essential for effective management. Enhanced understanding and targeted treatment strategies, such as individualized iron supplementation and addressing underlying inflammatory or functional abnormalities, are crucial in improving patient outcomes and quality of life (16).

Broader Implications for Management Effective management of IBS requires tailoring treatment strategies to the individual patient's symptoms, subtype, and underlying factors. This may involve a combination of dietary modifications, pharmacological interventions, and psychological therapies (26). Dietary changes, such as the lower intake of FODMAP diet, have shown promising results in managing IBS symptoms. To avoid irritable bowel syndrome (IBS) symptoms, cut back on short-chain carbs (27). For irritable bowel syndrome (IBS), researchers have looked at a variety of pharmacological drugs, such as loperamide (for diarrhoea), ispaghula (for constipation), musculotropic spasmolytics (for stomach discomfort), and antidepressants (for pain relief). To be sure, people may react differently to the treatment and have different tolerance levels (26,28). Psychological comorbidities, including anxiety and depression, as well as stress, can greatly affect the progression of irritable bowel syndrome. For better symptom management and overall well-being, consider adding cognitive-behavioral therapy (CBT) and relaxation strategies to your treatment strategy (27). Empowering people to properly manage their disease requires education regarding the nature of irritable bowel syndrome (IBS), its causes, and treatment alternatives. Both treatment adherence and results can be improved by creating a strong patient-provider connection and offering support through patient-centered care (27,28) Disruptions to a person's physical, mental, and social health can occur as a result of irritable bowel syndrome. In particular, individuals whose IBS symptoms are most marked by diarrhoea might benefit from better symptom control and health- related quality of life when their condition is well-managed (27).

CONCLUSION

This case underscores the importance of considering anatomical anomalies in patients with complex symptomatology. The malrotated kidney, though an incidental finding, may significantly contribute to the patient's recurrent abdominal pain and potentially to her persistent anemia. A thorough, multidisciplinary

approach is essential for optimal management, addressing both the primary diagnosis of IBS and the implications of the renal anomaly. This case also highlights the value of detailed imaging studies in uncovering clinically relevant incidental findings that can influence patient care and outcomes.

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