



Journal Homepage: - www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/15911

DOI URL: <http://dx.doi.org/10.21474/IJAR01/15911>



RESEARCH ARTICLE

RADIOLOGICAL MANAGEMENT OF SPLENIC ARTERY INJURY FOLLOWING ROUTINE COLONOSCOPY

Sima Patel, Blanca Carioni and Gordon Pereira

Manuscript Info

Manuscript History

Received: 25 October 2022

Final Accepted: 28 November 2022

Published: December 2022

Abstract

Colonoscopies can be used for both interventional and diagnostic purposes. The use of colonoscopies is not without risk and an awareness of these risks, as well as the clinical presentation of these risks / adverse effects, is vital to ensure optimal patient care is achieved both throughout and after the procedure. We present a case of a 49-year-old patient who presented to a district general hospital within the National Health Service (NHS) with diffuse abdominal pain and haemodynamic instability following a colonoscopy. A splenic artery injury was identified following a computerized tomography (CT) scan with contrast, of the abdomen and pelvis of the patient. The patient was resuscitated and managed without the need of surgical intervention in the form of targeted splenic artery embolization. This case highlights that a high index of suspicion of splenic injury should be held by the clinician in any patient who presents with abdominal pain with or without haemodynamic instability as early intervention is key to good patient outcomes.

Copy Right, IJAR, 2022,. All rights reserved.

Introduction:-

Colorectal malignancy is the third most commonly diagnosed malignancy globally [1]. Within the United Kingdom (U.K), colorectal cancer had the 4th highest number of newly diagnosed cases in 2019 with 44,706 new cases diagnosed in 2019. Colorectal cancer had a mortality rate of 10.5% (17,484 combined male and female deaths) in 2019 making it the second most fatal cancer within the UK [2].

The identification of suspected colorectal malignancy can be carried out in a number of ways. Direct Visualisation of the colon can be done in the form of a colonoscopy or sigmoidoscopy (sigmoidoscopy being limited to the sigmoid colon). Computed tomography (CT or CAT) colonography allows a two-dimensional view of the bowel and requires the interpretation of images to assess whether possible malignancy is present. Guaiac faecal occult blood test (FOBT) and faecal immunochemical test (FIT) uses stool samples which are tested for blood which could be a sign of polyps or malignancy. A positive test is when blood is identified in the faeces. However, other causes of a positive result may include an upper gastrointestinal bleed, blood from a bleed in the stomach or eating rare meat. Stool DNA tests can be utilised via analysing DNA from faecal samples to assess for cancers. The use of stool DNA is to help guide the clinician in deciding whether a colonoscopy is required [3].

The Bowel Cancer Screening Programme has been operational since 2006 in the UK. The program aims to provide early detection of colorectal malignancy to better provide treatment for the condition. The Bowel Cancer Screening Program is open to all individuals aged 50 years or older. These individuals are provided with a home test kit (FIT)

to collect a stool sample which is then sent for analysis to see if there are any traces of blood. If the test is positive (trace blood identified), the individual will be invited for further testing which may include a colonoscopy [4].

Cost analysis estimates have showed that it is potentially cost effective to screen individuals for the early detection of colorectal malignancy compared with a no screening policy with the marginal cost effectiveness of screening estimated to be less than £3000 per quality adjusted life year gain [5].

Colonoscopy involves direct visualisation of the large bowel from rectum to terminal ileum. Following assessment and satisfaction of capacity, as part of the consent process, all patients should have risks and benefits fully explained to them prior to the intervention [6].

Colonoscopies are performed for the diagnosis and management of a range of colonic diseases and not just malignancy. As the number of colonoscopies increases, so should the awareness of potential adverse effects which includes both the identification and management of them [7].

As with any procedure, colonoscopies come with risks. Adverse effects are affected by patient characteristic and endoscopist [7]. Risks associated with colonoscopy include bleeding, perforation, cardiovascular risk, respiratory risk, post polypectomy syndrome (abdominal pain, fever and peritoneal signs without radiological evidence of perforation) and splenic injury [8].

The Department of Health suggest that consent forms should include all information which will allow an individual to make an informed decision. This statement also means that you must inform the patient of serious adverse effects, less serious adverse effects or complications if they occur frequently or risk of procedure failure [6]. Splenic injury is a rare adverse effect associated with colonoscopies and endoscopist may not always include this as part of the list associated with colonoscopies.

With an aging population and increasing colonoscopies performed, splenic injuries have the potential to become more common and thus it is vital to be aware of both surgical and nonsurgical interventions so to provide optimal patient care.

We discuss a rare case of splenic artery injury following a routine colonoscopy which led to the patient becoming peri arrest and needing intensive care treatment. The patient, once stabilised, was treated without the need for operative surgical intervention in the form of splenic artery embolization with good outcome.

Case Presentation

A report on a 49-year-old female with a past medical history of chronic obstructive pulmonary disease and hypertension. She presented to a district general hospital within the National Health Service (NHS) following a splenic injury after a routine colonoscopy was performed as the patient was experiencing intermittent left iliac fossa pain with no cause identified.

The patient experienced diffuse abdominal tenderness with localised peritonism in the left lower quadrant, 12 hours following a difficult colonoscopy.

The patient's observation on arrival were as follows; heart rate 152 beats per minute, blood pressure 47/39 millimetre of mercury, oxygen saturations was 92% on room air, respiratory rate 8 breaths per minute and temperature 35 degrees celsius. The patient was resuscitated with intravenous red blood cells, fresh frozen plasma and intravenous fluids and transferred to the intensive care unit (ICU) for further supportive management.

A computed tomography (CT) scan of the abdomen and pelvis, with contrast was performed which demonstrated a large peri splenic haematoma measuring 11cm in diameter, active extravasation and hemoperitoneum. (Figure 1)

Figure 1:- CT abdomen and pelvis with contrast, axial view, showing hemoperitoneum (A), splenic haematoma (B) and extravasation of contrast in keeping with active splenic bleed (C).

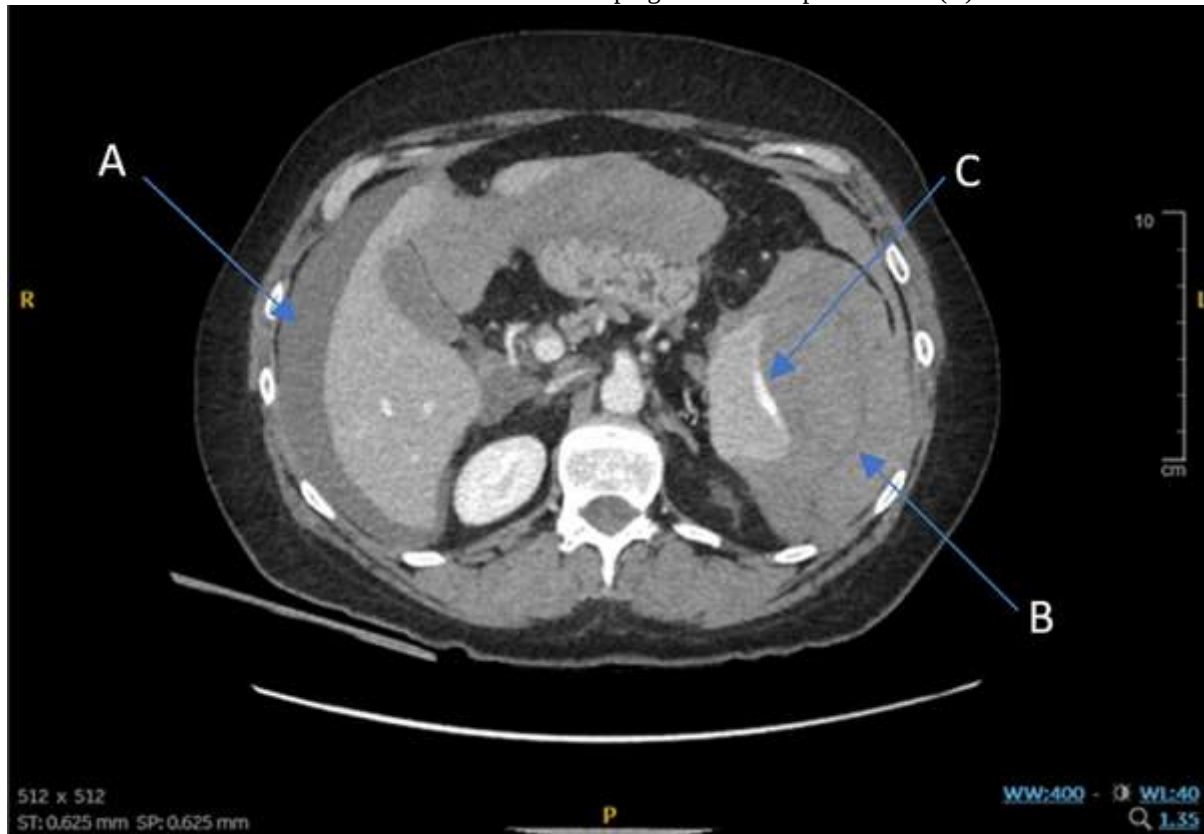


Figure 2 shows the coronal view of the CT scan

Figure 2:- CT abdomen and pelvis with contrast, coronal view, showing hemoperitoneum (A), splenic haematoma (B) and extravasation of contrast in keeping with active splenic bleed (C).



Blood results pre and post colonoscopy are shown below in table 1.

Table 1:- Blood results for patient following colonoscopy and splenic injury. Table shows decline in haemoglobin in keeping with an active bleed.

	Pre-Colonoscopy – 23.09.2021 at 19:22 hours (GMT)	Post Colonoscopy 24.09.2021 at 02:56 hour (GMT)	Post colonoscopy 24.09.2021 at 06:51 (GMT)
Haemoglobin	127	89	71
White Cell Count	15.2	16.8	11.51
Neutrophils	11.7	15.0	115
Platelets	164	160	10.23
C Reactive Protein	7	11	Not preformed
Estimated glomerular filtration rate	79	>90	>90
International normalized ratio	1.0	1.0	Not preformed

Following successful resuscitation, the patient was treated via the incorporation of interventional radiology in the form of splenic artery embolization. Embolization was performed with 3mm and 4mm MicroNester Coils™ distal to dorsal pancreatic artery, with stasis in splenic artery and preserved flow to the pancreas. Haemodynamic improvement was noted on table following coil embolization. Outcome of embolization is shown below in figure 3.



Figure 3:- Interventional radiology - fluoroscopy showing coil embolization of the splenic artery.

Patient was noted to have persistently low haemoglobin 48 hours following successful embolization. A repeat CT of the abdomen and pelvis with contrast was performed with no active extravasation demonstrated post embolization.

A repeat CT abdomen pelvis was performed 8 days following interventional radiology due to on-going abdominal pain. Persistent para-splenic haematoma noted no signs of active extravasation.

Patient remained stable and was discharged 14 days following initial presentation and a follow up review 5 months after admission showed no significant adverse consequences.

Discussion:-

Colonoscopy is the golden standard in diagnosing colonic pathology. In the UK alone it is estimated that around 900,000 colonoscopies are performed each year, and that by 2020, medical authorities expect well over a million colonoscopies to be performed in UK hospitals [9]. They are considered as a safe procedure, but complications do happen, most commonly Intraluminal bleeding (0.3-2.1%) and colonic (micro) perforation (0.1-2.5%) [10]. Rare complications are mesenteric tear, portal venous gas, pneumothorax, injury of the spleen, among others [10, 11].

A splenic injury after colonoscopy is a rare, yet potentially life-threatening complication. Only a few cases and studies have been reported, the first one being described by Wherry and Zehner in 1974 [12]. Since then, less than 80 cases have been reported so far [13]. It has an incidence of around 0.00005 - 0.017% and a mortality rate of 5% [10]. It has been found that overall, there is a female gender preponderance (gender ratio of 3.8 :1) and an average age of 62 years (range 29-85) [14].

The main cause for this complication is tension on these ligaments: gastrosplenic, pancreaticosplenic and phrenosplenic ligament. Any kind of traction on these ligaments could determine a capsular rupture, which then could cause disruption of a portion of the parenchyma densely adherent to it. Another reason for splenic injury is due to pre-existing adhesions, or a combination of both [14].

Splenic rupture can occur in a normal spleen after a technically demanding colonoscopy, or as it has been mostly described in the literature, in uncomplicated colonoscopies [15]. In the case we presented, the endoscopist described the colonoscopy as a particularly difficult one. The cause for difficulty is unknown however could be both due to patient factors (anatomical) or endoscopist factors (experience level / confidence and skill level).

Other contributing factors to splenic injury include certain techniques used to navigate the splenic flexure, such as the blind advancement of the endoscope past the splenic flexure and hooking the splenic flexure to straighten the left colon [16].

The most common signs and symptoms of splenic injury include abdominal pain, referred left shoulder pain, peritoneal irritation, and orthostatic changes. Since is not a common complication, many of the previously reported cases were diagnosed relatively late, between 2 and 10 days after the procedure [17]. In the case described above, the patient complained of severe abdominal pain approximately 12 hours after the procedure. Viamonte et al, in a review of 14 patients with splenic injury after colonoscopy, observed abdominal pain in 64% of the patients soon after the procedure, and that hemodynamic instability was nearly universally seen [18].

Review of literature has shown the use of computerized tomography scan to aid diagnosis of splenic injury, the extent of injury and the presence of active bleeding or haematomas.

Treatment options include observation, selective arterial embolization, or splenectomy. The options are based on the haemodynamic status, active bleeding, the type of blood loss (venous vs. arterial), and availability of interventional radiology, especially out of hours in smaller general hospitals. In the current literature, splenectomy is the treatment of choice since it is the most frequently used option with 56.1% [10,19], followed by conservative treatment with 27.3% [10], and embolization which could potentially preserve splenic function was reported in only 3 cases [20]. In this case the preferred choice of treatment was embolization of splenic artery, showing haemodynamic improvement after the procedure, and no complications in the follow up after discharge.

Conclusions:-

Splenic artery injury following colonoscopy is a rare but potentially life-threatening condition. There should be a high index of suspicion of splenic injury in any patient presenting with abdominal pain without or without a degree

of haemodynamic instability following a colonoscopy. Prompt diagnosis and management is required to prevent patient harm.

Literature has shown that conservative management can be utilised in the haemodynamically stable patient following a splenic injury after colonoscopy. Operative management in the form of splenectomy can be considered in the haemodynamically unstable patient however splenic artery embolization has shown to be a suitable treatment option for those groups of patients in whom active bleeding of the splenic artery is noted and clinical features are favourable for radiological intervention.

References:-

1. NaNaKeum, Edward Giovannucci : Global burden of colorectal cancer: emerging trends, risk factors and prevention strategies. *Nature Reviews Gastroenterology & Hepatology* . 2019, 16:713-732. 10.1016/S2468-1253(22)00044-9
2. UK cancer statistics. (UK Cancer Statistics and Data). Accessed: December 12th 2022: <https://www.wcrf-uk.org/preventing-cancer/uk-cancer-statistics/>.
3. Colorectal Cancer: Screening. (2022). Accessed: December 15th 2022: <https://www.cancer.net/cancer-types/colorectal-cancer/screening>.
4. Bowel cancer screening - NHS. (2021). Accessed: December 12th 2022: <https://www.nhs.uk/conditions/bowel-cancer-screening/>.
5. Paul Tappenden¹, James Chilcott¹, Simon Eggington, et al.: Option appraisal of population-based colorectal cancer screening programmes in England. *Gut*. 2007, 56:677-84. 10.1136/gut.2006.095109
6. Simon M Everett, Helen Griffiths, U Nandasoma, et al.: Guideline for obtaining valid consent for gastrointestinal endoscopy procedures. *BMJ*. 2016, 65:1585-601.
7. Su Young Kim, Hyun-Soo Kim, and Hong Jun Park: Adverse events related to colonoscopy: Global trends and future challenges. *World J Gastroenterol* .. 2019, 25:190-204. 10.3748/wjg.v25.i2.190
8. Marcel Tomaszewski, David Sanders, Robert Enns, et al.: Risks associated with colonoscopy in a population-based colon screening program: an observational cohort study. *CMAJ Open* . 2021, 9:940-947. 10.9778/cmajo.20200192
9. Colonoscopy: when is it necessary? . (2019). Accessed: December 13th 2022: <https://www.topdoctors.co.uk/medical-articles/when-to-consider-a-colonoscopy>.
10. Ha, J.F. and Minchin, D.: Splenic injury in colonoscopy: A review. *International Journal of Surgery*. 2009, 5:424-427. 10.1016/j.ijso.2009.07.010
11. Brennan, I.M., Faintuch, S. and Sacks, B. : Superselective splenic artery embolization for the management of splenic laceration following colonoscopy. *Acta Radiologica Short Reports*. 2014, 3:3. 10.1177/2047981614524199
12. Wherry, D.C. and Zehner, H. : Colonoscopy-fiberoptic endoscopic approach to the colon and polypectomy. . *The Medical Annals*. 1974, 4:189-192.
13. Petersen C, Adamsen S, Gocht-Jensen P, et al.: Splenic injury after colonoscopy. *Endoscopy*. 2007, 40:76-79. 10.1055/s-2007-966940
14. Nallayici, Erol G, de Groot R, et al.: Shock due to Splenic Injury after Colonoscopy. *Case Reports in Gastroenterology*. 2017, 11:127-133. 10.1159/000455940
15. Sarhan, M., Ramcharan, A. and Ponnappalli, S. : Splenic Injury after Elective Colonoscopy. *JSLs : Journal of the Society*. 2009, 13:616-619.
16. McBride R, Dasari B, Magowan H, et al.: Splenic injury after colonoscopy requiring splenectomy. *Case Reports*, 2013(jun03). 2013, 1:2013009126-2013009126. 10.1136/bcr-2013-009126
17. Reissman, P. and Durst, A.L. : Splenic hematoma A rare complication of colonoscopy. *Surgical Endoscopy*. 1998, 12:154-155. 10.1007/s004649900618
18. Viamonte, M, Wulkan M, Irani H. : Splenic trauma as a complication of colonoscopy. *Surgical Laparoscopy & Endoscopy*. 1992, 2:154-157.
19. Hildebrand D R, Ben-sassi A, Ross N P, et al.: Modern management of splenic trauma. *BMJ*, [online] 348, p.g1864. 2014, 10.1136/bmj.g1864
20. Shankar, S. and Rowe, S. : Splenic Injury After Colonoscopy: Case Report and Review of Literature. 2011, 3:276-281.