Online Journal of Health and Allied Sciences
Peer Reviewed, Open Access, Free Online Journal
Published Quarterly : Mangalore, South India : ISSN 0972-5997
Volume 9, Issue 3; Jul-Sep 2010

Case Report:

Role of RBC labeled 99m-Tc scan, Histopathology and Immunohistochemistry in Diagnosis of Jejunal Gastrointestinal Stromal Tumor presenting as obscure gastrointestinal haemorrhage

Prasad K Shetty, Department of Pathology, Bhagwan Mahaveer Jain Hospital, Bangalore, India,
Sameer V Baliga, Department of Surgical Gastroentrology, Bhagwan Mahaveer Jain Hospital, Bangalore, India,
Balaiah K, Department of Pathology, Bhagwan Mahaveer Jain Hospital, Bangalore, India,
Gnana Prakash S, Department of Radiology, Bhagwan Mahaveer Jain Hospital, Bangalore, India.

Address For Correspondence:
Dr. Prasad k Shetty,
Surgical Pathologist,
Bhagwan Mahaveer Jain Hospital,
Vasanth Nagar, Millers Road,
Bangalore - 560052, India.
E-mail: dr.pkshetty@gmail.com

Citation: Shetty PK, Baliga SV, Balaiah K, Gnana Prakash S. Role of RBC labeled 99m-Tc scan, Histopathology and Immunohistochemistry in Diagnosis of Jejunal Gastrointestinal Stromal Tumor presenting as obscure gastrointestinal haemorrhage. *Online J Health Allied Scs.* 2010;9(3):21
URL: http://www.ojhas.org/issue35/2010-3-21.htm
Open Access Archives: http://cogprints.org/view/subjects/OJHAS.html and http://openmed.nic.in/view/subjects/ojhas.html

Submitted: Aug 21, 2010; Accepted: Sep 22, 2010; Published: Oct 15, 2010

Abstract:
Gastrointestinal stromal tumors (GIST) are relatively rare tumors of gastrointestinal (GI) tract, most commonly arise from the stomach followed by small intestine and colon, clinically GIST present with occult GI bleeding, abdominal pain and intestinal obstruction. We present a case of a jejunal GIST, which presented as an obscure GI haemorrhage. This case highlights how oesophagogastrodudenectomy and colonoscopy proved inconclusive in determining source of bleeding and the importance of RBC labeled 99m-Tc scan in detecting the source of GI bleeding and also emphasizes on histopathology and immunohistochemistry in diagnosis of GIST.
Key Words: Gastrointestinal stromal tumor; RBC labeled 99m-Tc scan; Immunohistochemistry

Case Report:
A 75 years old male presented to surgical gastroentrology department with 3- 4 days history of passing black colored stools, no history of abdominal pain/vomiting/hematemesis. He had no significant previous medical history. Clinical examination reveled pallor and his blood test showed a hemoglobin level of 7.3g/dl, his peripheral smear showed microcytic hypochromic anemia consistent with iron deficiency. Hemospot test (standard guaiac method) for stool reveled positive for occult blood. An oesophagogastroduodenoscopy was done and showed mild gastritis, colonoscopy was done upto distal 10 cms of ileum revealed stools mixed with dark-red blood suggestive of small bowel bleed. Since the GI bleeding was obscure patient was asked to under go RBC labeled 99m-Tc scan and multiple images were taken over a period of 5 hours which reveled accumulation of labeled RBC's in the small bowel at 1.5 hours and passing along large intestine in subsequent images, which suggested slow active Gastrointestinal (GI) bleed form small bowel probably from Jejunum.(Figure1)

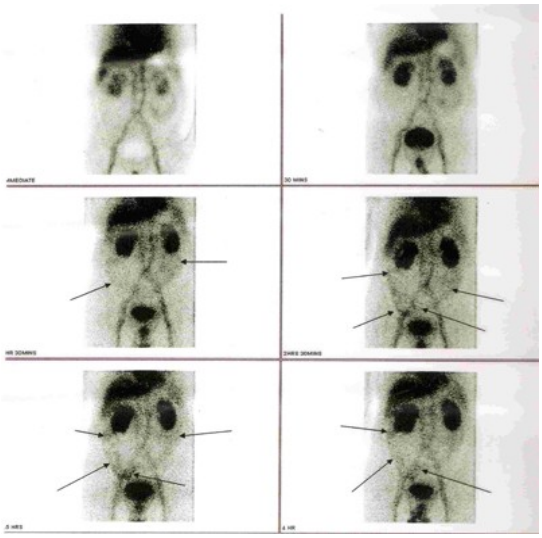

Figure1: RBC labeled 99m-Tc scan with multiple images taken over a period of 5 hours, images taken at 1.5hours and later show Tc labeled RBC's in the small bowel.

Based on the RBC labelled 99m-Tc scan findings an emergency laprotomy was performed which reveled a hard, eccentric and nodular tumor in the antimesentric border of the jejunum approximately 4 feet distal to the duodeno-jejunal flexure . This part of the small bowel was kinked. This segment of the jejunum was resected with the tumor with end to end anastomosis. Rest of the small and large bowel were unremarkable.

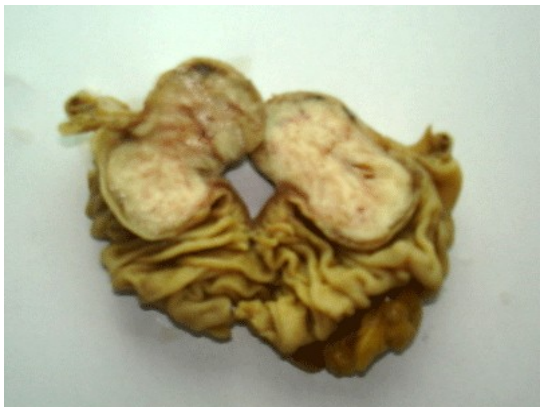

Figure 2: Gross Photo of segment of jejunum with a well-circumscribed gray white, lobulated tumor in the jejunal wall.

Grossly jejunal segment measured 11cms, out surface antimesentric border showed a bossulated mass 4cms from one resected margin, on cut opening jejunum lumen showed blood colts, mucosal surface covering the tumor showed irregularities, however no frank ulceration was seen on gross examination. On sectioning, jejunal wall showed a well-circumscribed gray white, smooth, lobulated tumor measuring 3.5x3.5cms with whorled-appearance.(Figure 2)

Microscopy: Jejunal mucosa showed erosion, submucosa shows tumor extending up to serosa with pushing borders, tumor showed fascicles of spindle cells with bipolar nucleus and eosinophilic cytoplasm with 3 mitosis/50 hpf, there was no evidence of necrosis and resected margins were free of tumor. (Figure 3)

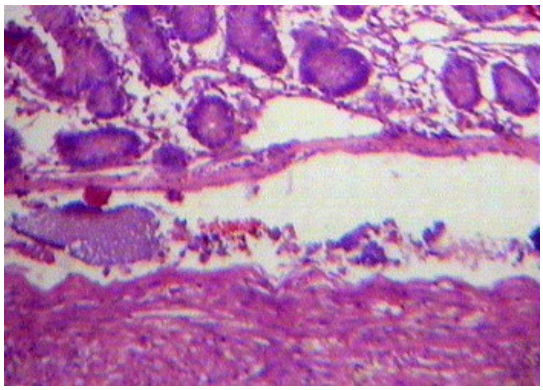

Figure3: Jejunal wall with tumor showing fascicles of spindle cells with bipolar nucleus and eosinophilic cytoplasm. (Hematoxylin and eosin x10).

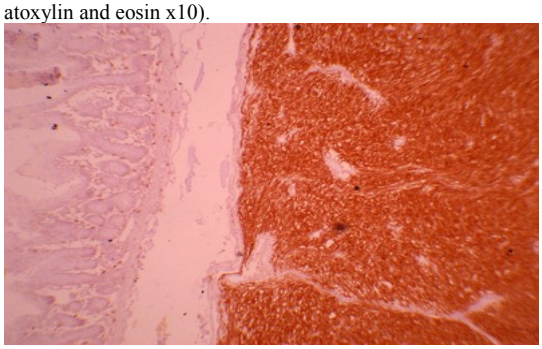

Figure 4: Tumor cells showing immunopositivity for CD-117 (IHC, x 200).

On Immunohistochemistry tumor cells showed wide spread positively for CD117 and negative for S100 protein.(Figure 4)

Based on Histological and immunohistochemical features we made a diagnosis of Gastrointestinal stromal tumor (GIST) smooth muscle type benign.

Patient had uneventful recovery.

Discussion:

GI bleeding is most commonly caused by polyps, inflammatory bowel disease, infectious diarrhoea vascular anomalies and malignancies. 95% of these disorders are usually be diagnosed by standard upper GI endoscopy and colonoscopy. 5% of GI haemorrhage is obscure in nature and small bowel GISTs have been described as one of the commonest cause.[1-3]

It has an incidence of 15 per million and forms 0.1-3% of all GI tumors, more commonly occur in middle-aged and older people with approximately equal sex distribution and have an overall 5-year survival of about 35%.[4] GISTs predominantly occur in stomach followed by the small intestine, colon, rectum, and oesophagus.[1] Clinically presents as GI bleeding (50%), followed by abdominal pain (20–50%) and intestinal obstruction (20%).[5]

In cases of obscure GI bleeding one must be able to image the small bowel effectively to establish the source of bleeding. Investegations like video capsule endoscopy (VCE) and double balloon enteroscopy (DBE) contrast-enhanced computed tomography (CT), CT angiography and RBC labeled 99m-Tc scan are of diagnostic importance for determining source of bleeding.[6]

GIST were thought to originate form smooth muscle and were designated as leiomyomas and leiomyosarcomas. In 1983 Maxur and Clark coined the term gastrointestinal stormal tumor to which includes benign and malignant mesenchymal tumors of gastrointestinal tract with myogenic or neural phenotype based on electron microscopy and immunohistochemical study.[7]

GIST cells closely resemble the interstitial cells of Cajal which arise from precursor mesenchymal cells, and express the transmembrane tyrosine kinase receptor. Gene mutations in these cells result in overexpression, causing neoplastic transformation and development of gastrointestinal stromal tumors. This may be detected by immunohistochemistry using the antibody CD117.[8,9]

GIST are divided into four major categories on the basis of their phenotypical features:

Category I: GIST showing morphological differentiation towards smooth muscle cells/epitheloid cells, as evidenced immunohistochemically by the expression of actin and desmin. These tumors constitute by far the largest category. Category I is further classified into three groups: (1) benign: mitotic count less than 5 / 50 HPF, tumor size 5 cm or less; (2) borderline, same mitotic number but tumor size larger than 5 cm; (3) malignant: mitotic count greater than 5 / 50 HPF, any size tumor. Category II: GIST Neural type (Malignant) showing apparent differentiation toward neural elements, and the tumors are designated as gastrointestinal autonomic nerve tumors (GANs), immunohistochemically positive for S-100 protein constitute the second largest group. Category III: GIST (Potentially malignant) showing dual differentiation toward smooth muscle and neural elements. Category IV: (Potentially malignant) Tumors lacking differentiation toward either cell type. In presented case histoimmunochemical features were of GIST smooth muscle benign.[10-12]

In conclusion, RBC labeled 99m-Tc scan is one of the most important investigation in locating the source of bleeding and Immunohistological markers CD117 and S100 in Diagnosis of GIST.

References:

1. Miettinen M, Lasota J. Gastrointestinal stromal tumours-definition, clinical, histological, immunohistochemical, and molecular genetic features and differential diagnosis. *Virchows Arch* 2001 Jan;438(1):1-12.
2. Spiller RC, Parkins RA. Recurrent gastrointestinal bleeding of obscure origin: report of 17 cases and a guide to logical management. *Br J Surg* 1983 Aug;70(8):489-493.
3. Fox VL. Gastrointestinal bleeding in infancy and childhood. *Gastroenterol Clin North Am* 2000;29:37–66.
4. Suster S. Gastrointestinal stromal tumors: Radiologic Features with Pathologic Correlation. *Semin Diagn Pathol* 1996;13:297-313.
5. Mucciarini C, Rossi G, Bertolini F, Valli R, Cirilli C, Rashid I et al. Incidence and clinicopathologic features of gastrointestinal stromal tumours. A population-based study. *BMC Cancer* 2007;7:230.
6. Hadithi M, Heine GD, Jacobs MA, Van Bodegraven AA, Mulder CJ. A prospective study comparing video capsule endoscopy with double balloon enteroscopy in patients with obscure gastrointestinal bleeding. *Am J Gatroenterol* 2006;101:52–57.
7. Connolly EM, Gaffney E, Reynolds JV. Gastrointestinal stromal tumors. *Br. J Surg* 2003;90:1178- 1186.
8. Graadt van Roggen JF, van Velthuysen MLF Hogendoorn PC. The histopathological differential diagnosis of gastrointestinal stromal tumors. *J Clin Pathol* 2001;54:96- 102.
9. Sircar K, Hewlett BR, Huizinga JD, Chorneyko K, Berezin I, Riddel RH. Interstitial cells of Cajal as precursors of gastrointestinal stromal tumors. *AM J Surg Pathol* 1999;23:377- 389.
10. Amin MB, Ma CK, Linden MD, Kubus JJ, Zarbo RJ. Prognostic value of proliferating cell nuclear antigen index in gastric stromal tumors. Correlation with mitotic count and clinical outcome. *Am J Clin Pathol* 1993;100:428-32.
11. Suster S, Sorace D, Moran CA. Gastrointestinal stromal tumors with prominent myxoid matrix. Clinicopathologic, immunohistochemical, and ultrastructural study of nine cases of a distinctive morphologic variant of myogenic stromal tumor. *Am J Surg Pathol* 1995;19:59-70.
12. Saul SH, Rast ML, Brooks JJ. The immunohistochemistry of gastrointestinal stromal tumors. Evidence supporting an origin from smooth muscle. *Am J Surg Pathol* 1987;11:464-473.