Research Paper

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Two interesting cases in The Spleen: A less studied organ!

Medical Science

KEYWORDS : Spleen, Splenenculi, Hypersplenism, Fibrocongestive splenomegaly, Sickle cell disease, Non-cirrhotic portal hypertension, Gamna-gandy bodies.

Dr. Shilpi Sahu	Associate Professor, Department of Pathology, MGM, Medical College, Kamothe, Navi Mumbai
Dr. Ujwala Maheshwari	Professor, Department of Pathology, MGM, Medical College, Kamothe, Navi Mumbai
Dr. Reeta Dhar	Professor & HOD, Department of Pathology, MGM ,Medical College, Kamothe, Navi Mumbai
Dr. Reenal Patel	IIyr post-graduate resident, Department of Pathology, MGM Medical College, Kamothe, Navi Mumbai

ABSTRACT

The spleen, is by nature, a bloody organ. Hypersplenism (dysplenism) refers to the excessive destruction of blood cells by the spleen, resulting in cytopenias of one or more blood cell lines. Hypersplenism may result from abnormalities inherent in the blood cells themselves or may be attributable to the increased sequestration of blood cells. Hypersplenism is of great clinico-pathological importance because it is the only major functional abnormality of the spleen, and it is the most frequent indication for splenectomy1. We report two interesting cases of hypersplenism with fibrocongestive splenomegaly secondary to sickle cell disease and non-cirrhotic portal hypertension (NCPH). The histopathological features of congestion and fibrosis of red pulp, sickled red cells in the sinusoids and gamna-gandy bodies were diagnostic of sickle cell disease in the first case whereas a fibrocongestive spleen along with only gamna-gandy bodies and clinical correlation of portal vein thrombosis was diagnostic of splenomegaly secondary to NCPH.

Introduction

Over the years, the human spleen has received attention in the literature, mostly from poets and philosophers as the seat of melancholy and bad temper.2 In English 'spleen' is still used to refer to anger, and in French, the same word means sadness. In physiology, the spleen has been described as early as Galen's era and, despite further insight in the 1970s into its sophisticated ultra structural microanatomy3, the spleen continues to remain a mysterious organ, often considered as an unnecessary reservoir. Progressive evidence is pointing, however, to the role of the spleen as a major contributor to immune, vascular and blood homeostasis4. Hypersplenism, therefore, is increasingly recognized as a pathological condition with potentially major consequences, such as pancytopenias and massive splenomegalies. Prevalence of fibrocongestive splenomegaly and hypersplenism in sickle cell disease is quite high whereas in NCPH, it is found in < 5% of the patients5. Therapeutic splenectomies were done for both the patients and the spleens were sent for histopathological examination.

Case Report:

Patient-1

A 19-year-old male patient came with the complaints of pain in abdomen since two days. The pain was sudden in onset, generalised and non-radiating. No other significant past history noted. Physical examination revealed tenderness and guarding all over the abdomen. Ultrasound abdomen showed spleen length measuring 10.5cm with multiple well defined hypoechoic lesions all over the spleen without significant vascularity. Abdominal computed tomography showed multiple non-enhancing (1.8cm) masses in spleen. Hematological findings - Therapeutic splenectomy was performed and spleen was sent for histopathological examination.

Gross:

Spleen weighed 180grams and size was 9x7x3cm. External surface showed multiple grey white nodules of varying size ranging from 1mm to coalesce nodules measuring 1cm in length and flat to rounded. Some were well circumscribed and irregular. Areas around splenic notch and gastric impression showed irregular patches of hemorrhage and nodules. On cut section, red and white pulp were identified.

Figure 1 – Gross photograph of the splenomegaly specimen with prominent surface coarseness and focal irregular nodularity6(arrow). Cut section shows rusty brown coloured areas.

Microscopy:

Hematoxylin and Eosin stained sections studied show expansion and congestion of red pulp with boat shaped and sickled shaped rbcs in the splenic sinusoids and the capillaries with presence of ferrofibrocalcific nodules(sclerotic bodies)/gamna-gandy bodies7. White pulp appeared **atrophied. Histopathological diagnosis of fibrocongestive** splenomegaly secondary to sickle cell disease was made.

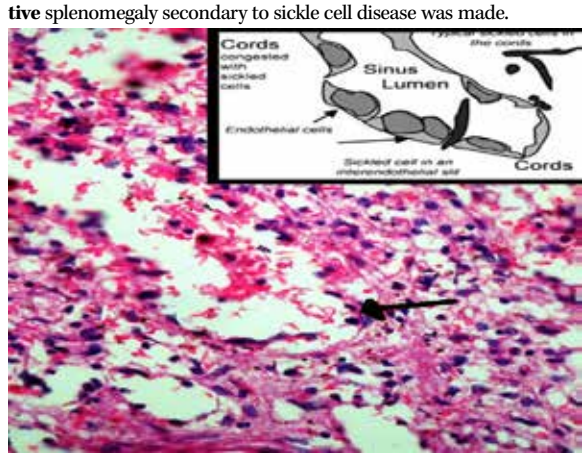

Figure 2 – Microphotograph showing marked expansion and clogging of splenic cords by sickled rbcs retained upstream of the sinus interendothelial slits as shown by thick arrows.

(original magnification x40,H&E stain)

Patient-2

A 30-year-old female patient came with the complaints of pain in abdomen since four years. The pain was insidious in onset, dull aching, generalised and non-radiating. Per abdominal examination revealed an enlarged spleen beyond the level of umbilicus. Hematological findings showed pancytopenia. Bone marrow aspiration revealed a normocellular mormoblastic marrow with increased eosinophilic myeloid cells. Abdominal computed tomography showed a normal liver with a span of 12cm with normal hepatic veins. There was 2cm thrombus at the division of portal vein. Portal vein was dilated measuring 23mm. Right and left portal veins were also dilated. Splenic vein was dilated measuring 26mm. Spleen was enlarged measuring 23cm with diffuse punctuate calcification. Therapeutic splenectomy was performed and was sent for histopathological examination.

Gross:

Spleen weighed 1.2kilograms and size was 22x17x2cm. External surface showed multiple congested areas. On cut section, red and white pulp were identified. Similar gross features were identified in splenenculi.

Figure 3 – Gross photograph of the splenomegaly specimen with few congested areas

and rusty brown cut section.

Microscopy:

Red pulp was expanded along with fibrosis and white pulp was reduced. Gamna-gandy bodies were seen. Histopathological diagnosis of fibrocongestive splenomegaly secondary to extrahepatic portal vein obstruction was made[5].

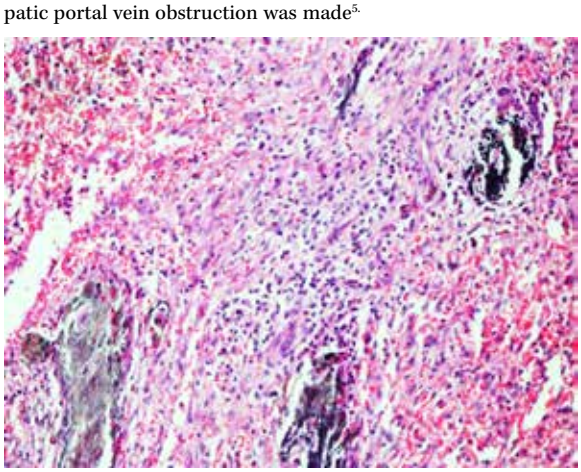

Figure 4- Microphotograph showing congestion and fibrosis of the red pulp along with sclerosiderotic nodules (Gamna-gandy bodies) in the congested splenic parenchyma.

(original magnification x10,H&E stain).

Discussion

There are very few studies and case reports based on histopathological findings in spleen. We report two cases of fibrocongestive splenomegaly in hypersplenic patients, one with sickle cell disease and another with non-cirrhotic portal hypertension(NCPH) due to extrahepatic portal vein obstruction (EHPVO).

In our first case, we reported a fibrocongestive spleen with gamna-gandy bodies secondary to sickle cell disease. Microscopy showed fibrocongestive spleen comprising of diffuse congested sinusoids mainly and splenic cords focally by sickled RBCs along with focal-to-extensive areas of fibrosis occupying the splenic parenchyma, septae and capsule. The sequelae of earlier infarction episodes were present and consisted of focal-to-extensive calcification, hemosiderin deposition and prominent sclerosiderotic granules (Gamna-gandy bodies)7.

Pathology of Sickle cell disease:

Sickle cell anaemia is a condition where splenic hypofunction is constant. However, unlike other conditions, such as celiac disease or inflammatory bowel disease in which hyposplenism results from splenic8, SCA may combine, notably in infancy, functional hyposplenism and splenomegaly. At birth, the spleen in SCA is morphologically and functionally normal. Progressive injury occurs when the haemoglobin switch initiates the multiple changes in the sickle RBC' adherence, plastic and signalling properties. The first histological description of the spleen in SCA was published in 19359 and describes 'Splenic cords stuffed with entangled masses of greatly elongated, pointed, curved and bizarre shaped erythrocytes. The lesions do not all progress at the same rate.' Granuloma-like nodules, known as Gamna–Gandy bodies, are characteristic, resulting from periarteriolar haemorrhage followed by fibrosis and impregnation of iron pigments10. The spleen is indeed prone to injury in SCA: the specific slow and open microcirculation favours in vivo deoxygenation and therefore sickling, which in turn favours RBC adhesion to the spleen matrix or macrophages due to increased expression of adhesion molecules and activation of usually quiescent proteins. In addition, impaired deformability of sickled RBC promotes their trapping upstream by the narrow inter endothelial slits. The splenomegaly of sickle cell disease is likely due to marked sluggishness and occlusive sickling in the venules and sinusoids of the spleen. The chief histological change included congestion involving the sinusoids mainly and the extensive fibrosis of capsules, septae, and splenic parenchyma. Hematological parameters were improved in the postsplenectomy period. Splenic enlargement does not imply its normal function, and the enlarged spleen acts only as a reservoir for blood with markedly deranged reticuloendothelial system (RES) function4.

In our second case, we reported a fibrocongestive spleen with gamna-gandy bodies secondary to noncirrhotic portal hypertension (NCPH)/idiopathic portal hypertension(IPH). NCPH is seen all over the world, though it is far more common in the developing world and also in low socioeconomic classes. Differences in socioeconomic status, living conditions, average lifespan, and ethnic background may be responsible for the higher occurrence in lower socioeconomic classes, though this is probably related to poor sanitation and hygiene and poor access to healthcare. The incidence of NCPF has probably declined over the past two decades along with a reduction in the incidence of extrahepatic portal vein obstruction (EHPVO). In adults, EHPVO is generally synonymous with thrombosis of the extrahepatic portal vein5.

Pathology of EHPVO:

The portal vein is replaced by a cluster of different sized vessels arranged haphazardly within a connective tissue support, and the original portal vein cannot be identified.

Macroscopic appearance of the liver in EHPVO patients varies

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from smooth to finely granular. Phlebothrombosis of intrahepatic portal vein branches, although much less common than in NCPF, is a common pathogenic denominator in NCPF and EHPVO. Small intrahepatic portal tracts show cavernomatous transformation in addition to mild portal fibrosis in a majority. Reduction in portal blood flow with concomitant increase in hepatic arterial

flow, and more dependence of the liver on hepatic arterial blood in EHPVO may contribute to a relatively reduced functional status of the liver. Imaging remains the cornerstone for the diagnosis of EHPVO as was seen in present case. Hypersplenism is by itself not an indication for surgical intervention, but profound thrombocytopenia with bleeding, repeated infections, or physical discomfort caused by massive splenomegaly may thus merit splenectomy5.

Conclusion

Spleen pathophysiology has been somewhat neglected in SCA, probably because clinical manifestations are predominantly paediatric and much effort has concentrated on treating the consequences of spleen dysfunction rather than causes. However, because of its central function in red cell homeostasis, the spleen is an important site of SCA pathophysiology4. Since symptomatic hypersplenism is found in < 5% of the patients of EHPVO and it is suspected in cases where spleen shows fibrosis, congestion and gamna-gandy bodies, it is essential to co-relate such cases clinically and through imaging studies.

REFERENCE

1. Ivan Damjanav, James Linder. Anderson's Pathology, 10th Ed, Ch – 43, Vol 1 (Mosby) 1201 – 1207. | 2. Baudelaire, C. (1869) Le Spleen de Paris. Michel Levy, Paris. | 3. Chen, L.T. & Weiss, L. (1972) Electron microscopy of the red pulp of human spleen. The American Journal of Anatomy, 134, 425–457. | 4. Valentine Brousse et al., The spleen and sickle cell disease: the sick(led) spleen. 2014- John Wiley & Sons Ltd, British Journal of Haematology.pg.1-12 doi:10.1111/bjh.12950. | 5. Harshal Rajekar et al., Noncirrhotic Portal Hypertension. Journal of clinical and experimental hepatology. (2011; 1: 94–108) | 6. Rajan Chopra et al. Fibrocongestive Splenomegaly in Sickle cell disease: A distinct clinicopathological entitiy in the Eastern. Province of Saudi Arabia. American Journal of Hematology. (2005, 79:180-186). | 7. Juan Rosai, Michael Houstan, Rosai & Ackerman's Surgical Pathology, 10th Ed, Ch- 22,Vol 2 (Mosby, Missouri, Elsevier,2013)1906-1907. | 8. Di Sabatino, A., Carsetti, R. & Corazza, G.R. (2011) Post-splenectomy and hyposplenic states.Lancet, 378, 86–97. | 9. Diggs, L.W. (1935) Siderofibrosis of the spleen in | sickle cell anemia. JAMA, 104, 538–541. | 10. Piccin et al. (2012) Composition and significance of splenic Gamna-Gandy bodies in sickle cell anemia. Human Pathology, 43, 1028–1036. |