Concurrent Pancreatic and Renal Leukemic Cell Infiltration

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Abstract Pancreatic involvement in acute lymphoblastic leukemia (ALL) is uncommon more so in adults. It can present as obstructive jaundice, pancreatitis or can be asymptomatic. We report here the clinical and imaging features in a 28 years old man with B cell ALL with simultaneous involvement of pancreas and bilateral kidneys. Computed tomography of abdomen showed diffuse infiltration of pancreas by multiple tiny hypodense lesions and multiple hypodense lesions in both kidneys. Although leukemic involvement of pancreas is unusual and our patient was asymptomatic, one should consider the possibility of pancreatic infiltration in a leukemic patient presenting with pancreatic enlargement, cholestatic jaundice or pancreatitis.

Keywords Leukemia · Pancreatic infiltration · Kidneys · Cholestasis · Pancreatitis · Chemotherapy

Introduction

Leukemic infiltration of pancreas is an unusual manifestation, reported more commonly in acute myeloblastic leukemia (AML) than acute lymphoblastic leukemia (ALL) [1]. Pancreatic involvement can be asymptomatic or it can present with cholestatic jaundice or pancreatitis. Concurrent involvement of pancreas and kidneys is rare with few

cases reported in the pediatric population [1–3]. To the best of our knowledge this is the first case of concurrent pancreatic and renal involvement in an adult with ALL. Here we report a case of B cell ALL in a young adult with diffuse infiltration of pancreas and kidneys with review of literature of pancreatic involvement in leukemia.

Case History

A 28 years old man presented with 1 month history of bleeding gums, fever and black stools. On physical examination, he was well built with mucocutaneous pallor, right cervical and left axillary lymphadenopathy. Petechia were noted in bilateral lower limbs and abdominal examination revealed splenomegaly. Complete blood count showed leukocyte count, 55,000/ μ L with 90 % blast cells, 8 % polymorphs, 4 % mature lymphocytes and 2 % monocytes. Hemoglobin was 8 g/dL and platelet count, 30,000/ μ L. Serum sodium, potassium, calcium, phosphorus, creatinine, blood urea nitrogen, total proteins, aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase and total bilirubin were found to be within normal limits. Viral markers for HBV, HCV and HIV were negative. Bone marrow aspiration showed 90 % blast cells with hypercellular marrow. Bone marrow biopsy showed blast cells twice the size of lymphocytes with agranular basophilic cytoplasm, 2–3 nucleoli without Auer rods and myeloperoxidase was negative. Flow cytometry revealed cells were positive for CD10, CD19, CD20, CD34, CD45, HLA-DR and negative for terminal deoxynucleotidyl transferase (TdT), CD3, CD4, CD7, CD8 indicating a precursor B cell phenotype. Cerebrospinal fluid examination did not show any evidence of central nervous system involvement. Ultrasonography abdomen showed hepatosplenomegaly. Computed tomography (CT) of chest

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Fig. 1 Computed tomography of abdomen shows splenomegaly with decreased attenuation indicating splenic leukemic infiltration. Multiple tiny hypodense lesions seen in pancreas (arrow)

Fig. 2 Computed tomography of abdomen shows multiple hypodense lesions in bilateral kidneys indicating leukemic infiltration

and abdomen (Fig. 1) revealed hepatosplenomegaly with diffusely decreased attenuation of spleen indicating involvement of spleen by leukemia. Pancreas showed normal bulk with heterogenous attenuation due to multiple tiny hypodense lesions (Fig. 1). Bilateral kidneys were mildly enlarged symmetrically with smooth outline. Multiple small low attenuation wedge shaped and geographic lesions are scattered in both kidneys with loss of corticomedullary differentiation. There was no hydronephrosis or perinephric involvement (Fig. 2). Few enlarged retroperitoneal and mesenteric lymph nodes (Fig. 3) with mild ascites, mild bilateral pleural and pericardial effusion were noted [not shown in figures]. Serum amylase and lipase were done and found to be normal. In a known case of ALL, these findings were likely due to leukemic infiltration of pancreas, spleen and kidneys. Chemotherapy and guided fine needle aspiration cytology were planned as the pancreatic involvement is uncommon in ALL. However patient's clinical status deteriorated and he succumbed to the disease process.

Discussion

Leukemic infiltration of pancreas is a very rare manifestation. Pancreatic involvement is rarely seen as presenting feature, more common in disseminated and recurrent cases and in the form of granulocytic sarcoma which is an extramedullary mass of myeloid cells. Common presentation of ALL patients is due to bone marrow failure in the form of generalized tiredness, bleeding and infections. In ALL common sites of extramedullary involvement include central nervous system, mediastinum, liver lungs, kidneys and testicles [1]. Involvement of pancreas is rare in ALL

Fig. 3 Computed tomography of abdomen shows multiple hypodense mesenteric lymph nodes (arrow)

more so in adults as compared to children [2–5]. Concurrent involvement of pancreas and kidneys as in this case is still more uncommon [6, 7].

Leukemic infiltration of pancreas can be asymptomatic or can be associated with cholestasis or pancreatitis. It is important to recognize this entity early to avoid cholestasis and pancreatitis, which by themselves are more common in leukemic patients due to chemotherapy. The common differential diagnoses for cholestasis in ALL include chemotherapy and diffuse hepatic infiltration by leukemic cells. Ultrasonography can show bulky pancreas with ill defined hypo echoic lesions. Very tiny lesions are beyond the sonographic resolution and sonography can be normal as in our case. On CT three different patterns of leukemic infiltration of pancreas are described in AML [8]: well or ill defined nodular form, diffuse infiltrative form and a

combination of both. The spectrum of involvement in ALL has not been studied in detail as the reported cases are very limited more so in adults. Daniel et al. [7] reported ALL in a 39 years old man with ill defined pancreatic mass. Ikawa et al. [2] reported similar findings in a 11 years old girl with concurrent involvement of kidneys. Two other reports [2, 4] both in children showed diffuse infiltration similar to the index case and mixed pattern of pancreatic involvement has been reported by Malbora et al. [3] in a 5 years old child. Radiological differential diagnoses for pancreatic leukemic infiltration include pancreatic lymphoma and autoimmune pancreatitis. Other lesions that can cause obstructive jaundice in this clinical context include pancreatic lymphoma, adenocarcinoma and peripancreatic lymphadenopathy. Pancreatic lymphoma closely mimics leukemic infiltration of pancreas radiologically and clinically. Bulky peripancreatic lymph nodes and multiple distant organ involvement are more common in lymphoma than in leukemic infiltration of pancreas. Pancreatic duct is usually not dilated in both conditions [5].

Renal involvement in leukemia is not uncommon, the incidence of which is variable ranging from 4 to 47 % [9]. Most often renal involvement is asymptomatic and leukemic infiltration of kidneys was observed in more than 50 % of cases in an autopsy study. Clinical presentations include nephromegaly, microscopic or less commonly gross hematuria and acute renal failure more common in children in the late stages [10, 11]. On imaging, symmetric smooth enlargement of kidneys is the commonest pattern of involvement, followed by bilateral multiple low attenuation masses. Other less common findings may include large areas of wedge shaped and geographic low attenuation, solitary unilateral low attenuation mass, solitary bilateral low attenuation masses and unilateral nephromegaly [12]. Isolated renal involvement of kidneys as a primary feature is uncommon. The differential diagnosis of low attenuation masses includes infection, nephroblastomatosis, simple cysts, angiomyolipomas and lymphomas. Perinephric space is involved in lymphoma but not in leukemia. The causes of bilateral enlarged kidneys include obstructive uropathy, Vesico Uretric Reflux, infections, Autosomal Recessive Polycystic Kidney Disease, Multicystic Dysplastic Kidney, leukemia, lymphoma and some storage disorders. The correct diagnosis requires imaging studies, bone marrow biopsy and biopsy or fine needle aspiration of the enlarged kidneys in rare cases.

In conclusion, renal involvement in leukemia is not uncommon and usually associated with other organ involvement. Involvement of pancreas is rare both as isolated and in combination with other organs. Concurrent pancreatic and renal involvement in leukemia is very rare.

When a leukemic patient presents with obstructive jaundice or features of pancreatitis, one should look for the evidence of pancreatic involvement in the form of diffuse enlargement to mass lesions. However one should remember that the common cause of this clinical presentation still remains iatrogenic use of chemotherapeutic agents like Asparaginase associated pancreatitis (AAP) [13]. Treatment of the underlying leukemia usually results in the resolution of the lesions and obstructive symptoms if present earlier. Renal involvement is most often asymptomatic and incidentally discovered during imaging.

Conflict of interest None.

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