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President's Column

Major General Mohammad Ayyub, HI(M)

Dear Colleagues Asalam-o-Alikum !

As the president of PSH it gives me great pleasure to write few words. One of the major reasons for establishing the Pakistan Society of Haematology was to endorse due recognition to the holding yearly conferences and by teaching practical applications in Haematology in workshops and symposium.

After decades of work, the last two to three years have brought about a successful translation of basic immunology that gave rise to two promising strategies to modify the immune system to treat cancer. One approach involves antibodies treat cancer. One approach involves antibodies targeting immune checkpoints, CTLA-4 and PD-1, to release the brake on T cells to attack tumor cells. Another strategy involves infusion of T cells genetically modified to express a chimeric antigen receptor (CAR) to target a specific tumor antigen. While immune checkpoint inhibitors gained their first clinical success in solid tumors, CAR T cells first emerged as a promising therapy in hematologic malignancies after several clinical trials demonstrating unprecedented clinical activity of CD19-targeted CAR T cells in patients with relapsed/refractory acute lymphocytic leukemia (ALL).

CD19-targeted CAR T cells have emerged as one of the most potent therapeutic agents in ALL and serve as a strong proof of principle for this novel immune-based approach. Multicenter phase II trials are commencing shortly in both pediatric and adult ALL. Furthermore, many groups are exploring the feasibility of utilizing CAR T cells to target non-C19 positive malignancies such as acute myeloid leukemia, multiple myeloma, brain tumors, prostate cancer, mesothelioma, and ovarian cancer, and more reports from these studies are expected in 2016.

These new strategies of treatment in the field of Haematology are eye opener to our young budding haematologists, who are the future hope of Pakistan.

With warm regards,

Major General Mohammad Ayyub, HI(M)

ACADEMICS

PRIMARY MULTIPLE PLASMACYTOMAS

Raheel Iftikhar, Parvez Ahmed, Tariq Mahmood Satti, Qamar un Nisa Chaudhry, Syed Kamran Ahmed, Mehreen Ali Khan, Armed Forces Bone Marrow Transplant Centre, Rawalpindi – Pakistan

Introduction

Plasma cell neoplasms are a group of disorders characterized by the abnormal proliferation of a single clone of plasma cells, typically producing a monoclonal immunoglobulin. Plasma cell neoplasms can present as a solitary plasmacytoma or multiple myeloma Solitary plasmacytomas most frequently occur in bone (plasmacytoma of bone), but can also be found outside bone in soft tissues (extramedullary plasmacytoma). Multiple extramedullary plasmacytomas are very uncommon with only few documented case reports in literature.

Case Report

A 60 years old house wife presented in outpatient department with history of gradually increasing swellings over chest, left forearm and right thigh for last 6 months. She had first noticed this swelling over front of her chest. It was painless and around size of a lemon. It gradually increased over next 3 months and patient noticed appearance of similar swellings over left forearm and right thigh. She also developed easy fatigability and inability to carryout routine physical activity. Past history was significant for hypertension for last 6 years for which she was taking tablet losartan off and on. Rest of her personal, family, socioeconomic and drug history was unremarkable. On examination she had a blood pressure of 140/90 mmHg. She had visible swellings over middle part of right clavicle, upper sternum, right thigh and left forearm (Figure 1). Swellings were fixed to underlying structures, firm to hard in consistency, had a smooth surface, non-pulsatile, non-tender without overlying skin erythema and were not fluctuant. Swelling over clavicle was 3 x4 cm, sternal swelling was 8 x 4 cm, forearm swelling was 3 x 2 cm (Figure 2) while thigh swelling was 4 x 4 cm. Rest of her general and systemic examination was unremarkable. Her complete blood counts showed hemoglobin, WBC and platelets within normal range. Erythrocyte sedimentation rate was 120 mm fall

at 1 hour with rouleaux formation visible on peripheral smear. Her liver functions tests, renal function tests, Urine microscopy, Serum lactate dehydrogenase, serum Albumin levels were all with in normal range. X-ray of Chest, forearm and thigh were unremarkable except for soft tissue masses visible in affected area on radiographs in chest, right femur and left forearm. CT scan of chest showed lytic lesions in right clavicle and upper sternum extending into overlying skin and soft tissue. CT scan of left forearm and right thigh demonstrated soft tissue non enhancing lesions with underlying bone involvement. Fine needle aspiration of Sternal mass and forearm swelling was done both of which showed sheets of mature plasma cells with abundant basophilic cytoplasm. The nucleus was round and eccentrically located with marked perinuclear hof consistent with diagnosis of plasmacytoma. These cells were CD138 positive and lambda light chain restricted. Her bone marrow aspiration and trephine biopsy showed only 3 % plasma cells. Serum protein electrophoresis showed presence of sharp monoclonal band in gamma region which on immunofixation was IgG lambda. On quantification M-protein was 1.48 g/dl. Serum B2 microglobulins, Serum free light chains and skeletal survey was unremarkable except for above defined lesions. On the basis of above history and investigations patient was diagnosed as having multiple solitary plasmacytomas with minimal marrow involvement as per definition of International Myeloma Working Group 2014 updated criteria for the diagnosis of multiple myeloma (3). Because of multiple plasmacytomas at different sites and high risk of progression to Multiple myeloma, Patient was advised combination chemotherapy with melphalan, thalidomide and prednisolone.

Discussion

Solitary plasmacytoma constitute approximately 5 percent of all cases of plasma cell disorders. Plasmacytoma is an abnormal proliferation of plasma cells and can be primary or secondary (4). Primary plasmacytomas occur in absence of pre-existing pathology while secondary plasmacytomas can appear after treatment of multiple myeloma or after radiotherapy of Solitary plasmacytoma. Men are diagnosed twice as frequently as women. The median age at diagnosis is 55 to 65 years (5). These plasmacytomas can be osseous (medullary) or nonosseous (extramedullary) tissues. Extramedullary plasmacytomas arises from outside bone marrow and are usually solitary,

however, rarely multiple plasmacytomas are present. Sites most commonly involved in extramedullary plasmacytoma are aerodigestive tract, gastrointestinal tract, urogenital tract, skin, soft tissues, lung and breast. The International Myeloma Working Group in 2003 recognized a separate classification of plasmacytomas that occur as multiple sites of disease in soft tissue, bone, or both soft tissue and bone as **multiple solitary plasmacytoma**. There diagnostic criteria includes : No or small amount of M-protein in serum and/or urine, more than one localized area of bone destruction or extramedullary tumour of clonal plasma cells, otherwise normal skeletal survey and no myeloma related organ damage (6). These patients can have isolated plasmacytomas without any monoclonal gammopathy or can have small amount of detectable paraprotein. Patients with multiple plasmacytomas have aggressive disease with high risk of progression to multiple myeloma. In patients with two concurrent discrete plasmacytomas with no bone marrow involvement radiation to both sites is recommended. In patients with more than two concurrent lesions, systemic therapy identical to that used for multiple myeloma is indicated, even if the bone marrow is normal (7). For patients who develop two or three solitary lesions within a period of one to two years, subsequent therapy should be as if the patient has multiple myeloma.

Hussain A and colleagues reported a case of multiple extramedullary plasmacytomas with lytic bone lesions (8). Tüting and Bork published a case of a solitary cutaneous plasmacytoma of left thigh without bone marrow involvement (9). Kaviani et al. reported case of a 70-year-old woman with bilateral breast masses that afterwards proved to be a recurrence from extramedullary plasmacytoma of the mediastinum for which she got treatment 5 years back (10) . Shahid et al. presented a rare case of solitary lytic lesion in the medial part of clavicle with biopsy revealing plasmacytoma (11). Most patients with SPB progress to multiple myeloma in 4 years. In contrast, 80 % Patients with multiple plasmacytoma progress to multiple myelmoa in 1 year (12). It can be concluded that plasma cell disorders can rarely present as multiple extramedullary plasmacytoma, these patients have more aggressive disease course and needs to be treated like symptomatic multiple myeloma.

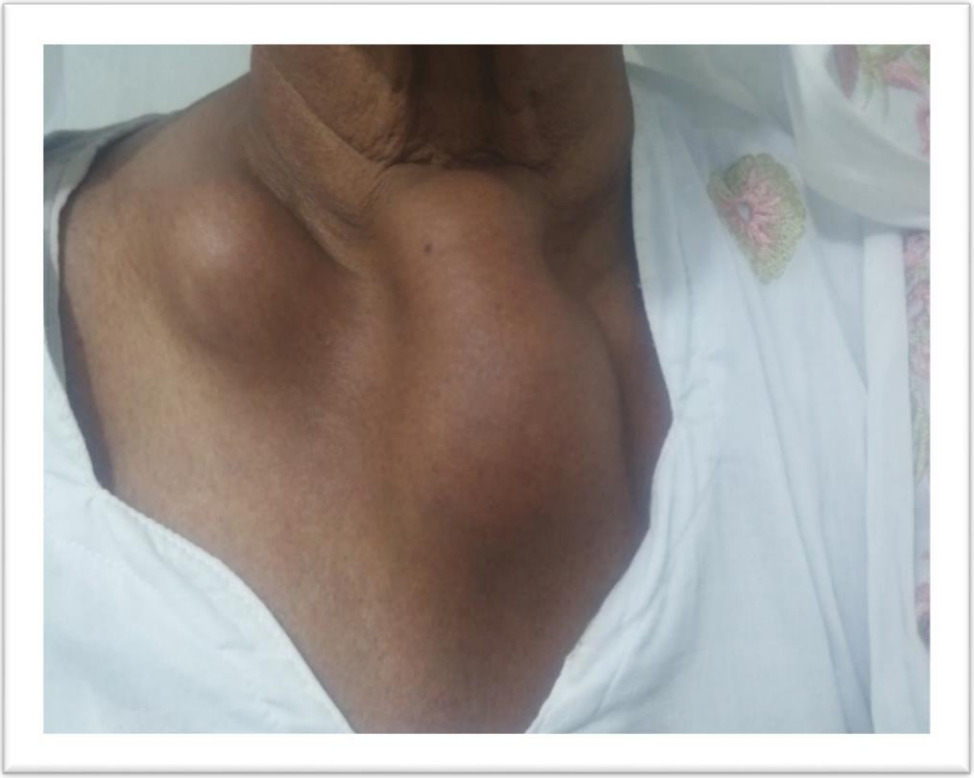

Figure 1: Plasmacytomas of right clavicle and sternum.

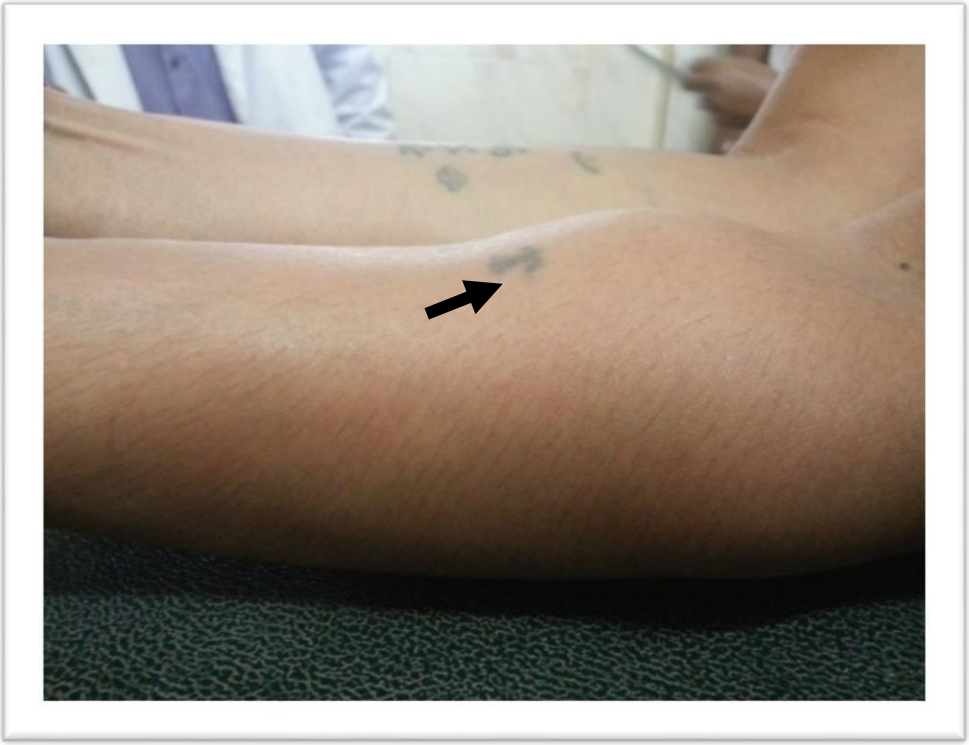

Figure 2: Plasmacytomas of left forearm.

References

1. Hughes M, Doig A, Soutar R. Solitary plasmacytoma and multiple myeloma: adhesion molecule and chemokine receptor expression patterns. Br J Haematol 2007; 137:486.
2. Reed V, Shah J, Medeiros LJ, Ha CS, Mazloom A, Weber DM, Arzu IY, Orlowski RZ, Thomas SK, Shihadeh F, Alexanian R. Solitary plasmacytomas. Cancer. 2011 Oct 1;117(19):4468-74.
3. Rajkumar SV, Dimopoulos MA, Palumbo A, Blade J, Merlini G, Mateos MV, Kumar S, Hillengass J, Kastritis E, Richardson P, Landgren O. International Myeloma Working Group updated criteria for the diagnosis of multiple myeloma. The Lancet Oncology. 2014 Nov 30;15(12):e538-48.
4. Soutar R, Lucraft H, Jackson G, et al. Guidelines on the diagnosis and management of solitary plasmacytoma of bone and solitary extramedullary plasmacytoma. Br J Haematol 2004; 124:717.
5. Warsame R, Gertz MA, Lacy MQ. Trends and outcomes of modern staging of solitary plasmacytoma of bone. Am J Hematol 2012; 87:647.
6. International Myeloma Working Group, “Criteria for the classification of monoclonal gammopathies, multiple myeloma and related disorders: a report of the International Myeloma Working Group,”British Journal of Haematology, vol. 121, pp. 749–757, 2003.
7. Kilciksiz S, Karakoyun-Celik O, Agaoglu FY, Haydaroglu A. A review for solitary plasmacytoma of bone and extramedullary plasmacytoma. The Scientific World Journal. 2012;2012.
8. Hussain A, Singh M, Singh K, Bagga H. Multiple Extramedullary Plasmacytoma with Lytic Bony Lesions: A Rare Case Report. Case reports in medicine. 2013;2013.
9. T. Tüting and K. Bork, “Primary plasmacytoma of the skin,” Journal of the American Academy of Dermatology, vol. 34, no. 2, part 2, pp. 386–390, 1996
10. A. Kaviani, M. D. Zavareie, M. Noparast, and S. Keyhani-Rofagha, “Recurrence of primary extramedullary plasmacytoma in breast both simulating primary breast carcinoma,” World Journal of Surgical Oncology, vol. 2, article 29, 2004
11. M. Shahid, N. Z. Hali, A. Mubeen, et al., “Solitary plasmacytoma of clavicle—a rare case presentation,”Journal of Cytology & Histology, vol. 1, article 103, 2010.
12. Hill QA, Rawstron AC, de Tute RM, Owen RG. Outcome prediction in plasmacytoma of bone: a risk model utilizing bone marrow flow cytometry and light-chain analysis. Blood 2014; 124:1296.

CRYSTALLINE BONE MARROW IN YOUNG LADY

Farwa Raza, Ch Altaf Hussain, Saleem Ahmed Khan, Hamid Saeed, Mohammad Ayyub Department of Pathology, Armed Forces Institute of Pathology, Rawalpindi

Introduction:

Hyperoxaluria is found in approximately 20% of stone formers. Dietry factors such as high oxalate and low calcium intake account for hyperoxaluria in most such patients. The degree of hyperoxaluria observed in these circumstances is mild. Primary hyperoxaluria is a rare autosomal recessive disorder of hepatic glyoxylate metabolism resulting in overproduction of oxalate. Oxalate nephropathy results in renal failure, which leads to further increase in plasma concentration of oxalate. Calcium oxalate can then deposit into wide array of tissue including bone, retina, peripheral nerves, arterial media and the heart. In patients with primary hyperoxaluria, kidney failure can occur at any age from infancy to middle or even late adulthood. Earlier literature showed that CKD develops in 50% of patients by 15 years of age and 80% develop renal failure by age of 30 years. Recent studies suggest that with improved diagnosis and management, median age at kidney failure is 33 years. Due to lack of familiarity with disease, delay of many years from onset of symptoms to diagnosis is common. Onset of calcium oxalate stone formation or nephrocalcinosis in childhood and adolescence that are associated with CKD are important clues in diagnosis and warrant specific diagnostic testing for the disease. Here we report a case of oxalosis who presented with end stage renal failure and erythropoietin resistant anaemia, with oxalate crystal deposition in bone marrow.

Case Report:

A 25 year old female patient diagnosed case of CKD on regular haemodialysis since 2012. She was referred to our department for evaluation of refractory anaemia. She had past history of multiple stones in both kidneys (figure 1) & was operated in emergency in 2003. Multiple stones were removed from left kidney, the maximum size of stone was 2-2.5cm. Patient was investigated later on and found to be hyperparathyroid and stone chemical analysis revealed that they were calcium oxalate. Radiological evaluation showed patient had osteopenia (figure 2).

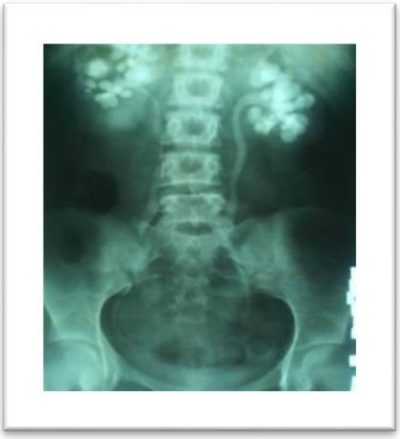

Figure 1: Bilateral multiple stones

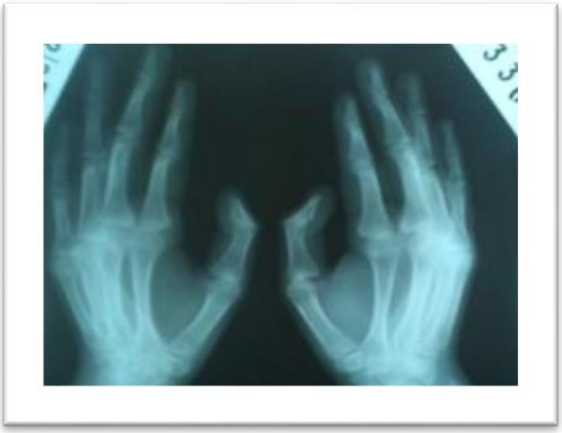

Figure 2: Osteopenia

She was lost to follow up till 2012 when she again reported to urology OPD & was diagnosed as CKD & started with regular haemodialysis twice weekly, taking Vitamin D, Calcium supplementation, antihypertensive treatment and erythropoietin injection with regular monitoring of RFTs, Bone profile & Parathyroid hormone. Patient was referred to Haematology department for evaluation of erythropoietin resistant anaemia.

She had four siblings and all are alive & healthy. Multiple blood transfusions had been given since 2012 & last transfusion was 2 weeks back. On examination she was thin lean, pale looking young lady, there was no visceromegaly. Her full blood counts showed Hb: 8.4 gm/dl, WBC count: 1.92 x 10^9 /L, Plt count: 319 x 10^9 /L. Her serum urea: 8.4 mmol/l (N 3.3-6.7 mmol/l); serum creatinine: 304 umol/l (N 55-100umol/l); Serum albumin: 41g/l (N 35-50g/l) and s.alkaline phosphatase: 788U/L (N <258U/l). Bone profile showed serum calcium was 2.26 mmol/l (N 2.1-2.65 mmol/l); serum phosphate: 3.0 mmol/l (N 0.81-1.62mmol/l) and total Vitamin D: 23nmol/l (deficiency <25 nmol/l). USG & CT Scan abdomen showed both kidneys were atrophic with with multiple calculi in right kidney. Peripheral blood film & bone marrow aspirate showed bicytopenia. Histological examination of

trephine marrow biopsy showed pericrystalline giant cell granulomata with foreign body giant cells and moderate paratrabecular fibrosis. There is heavy deposition of oxalate crystals arranged in radial pattern around central amorphous core. These crystals were birefringent under polarized light. Patient was further investigated for gene mutation.

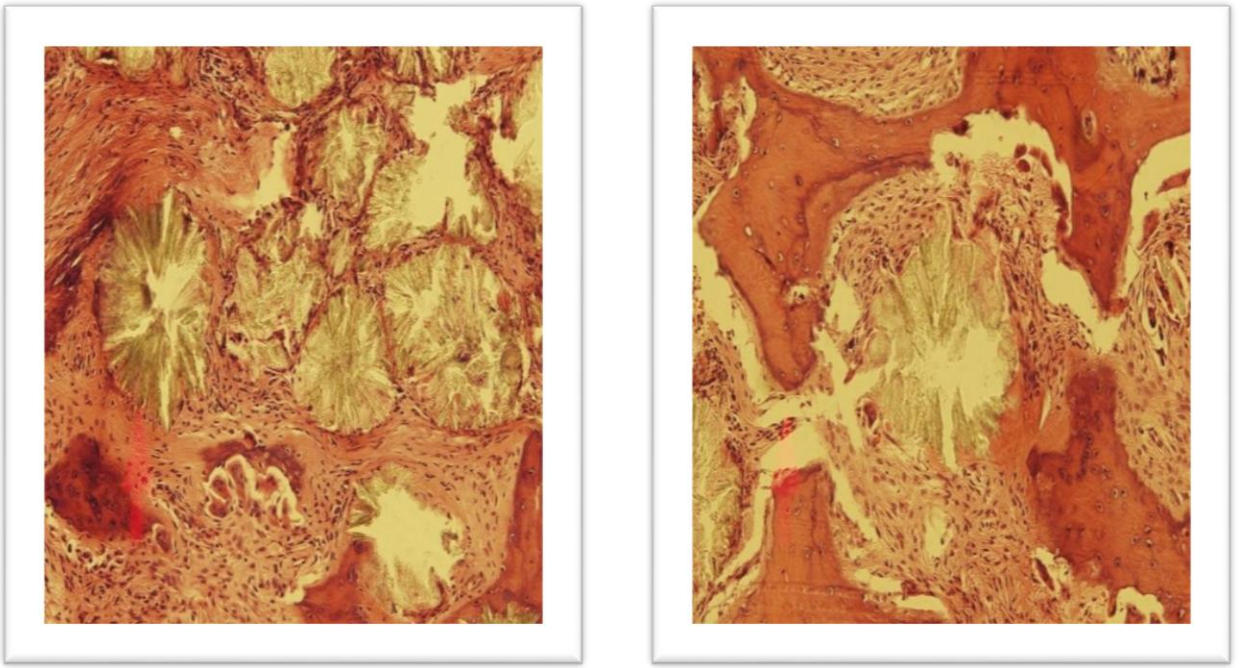

Figure 1: Bone marrow trephine showing pericrystalline giant cell granulomata

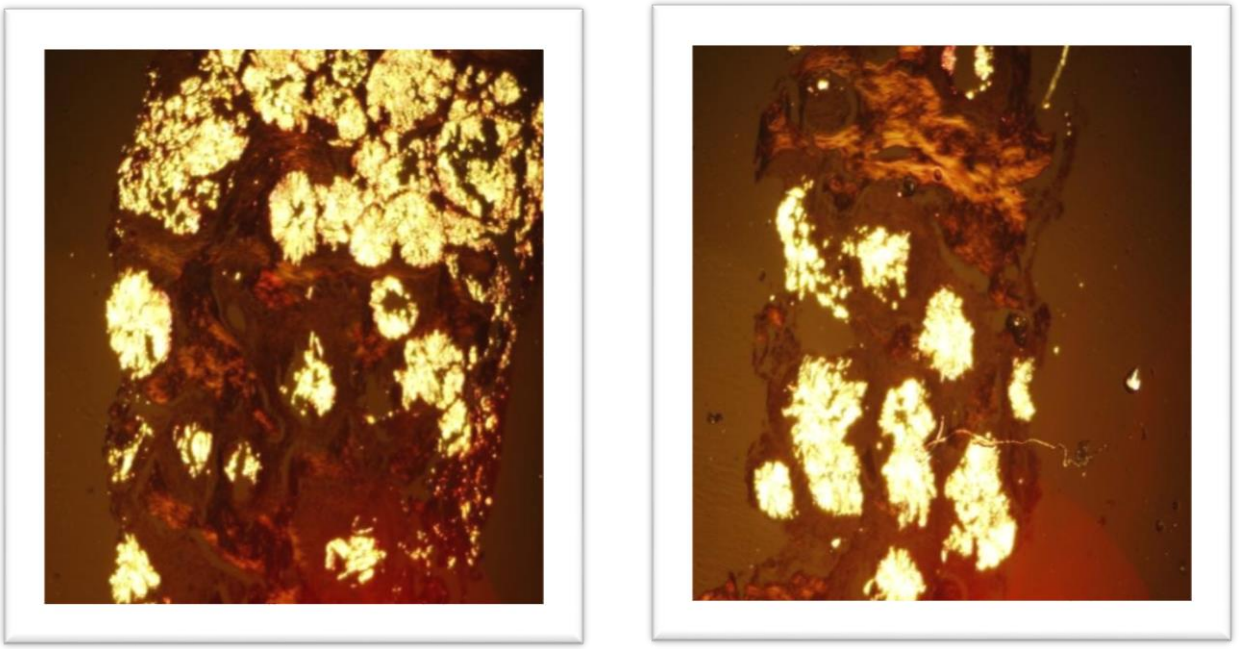

Figure 2: Oxalate crystals seen through polarized light

Discussion:

In the patient with hyperoxaluria, symptoms may occur any time from birth to adulthood and presentation can vary from mild to severe. The first sign is usually blood in urine, pain, passage of stone or urinary tract infection related to kidney stones. Minority of patient presents with kidney failure as first sign. Our patient was young adult who presented rather late with wide spread deposition of oxalates, as evidenced by nephrolithiasis, renal failure and morphological evidence of oxalate deposition in bone and bone marrow. Even though family history of patient was not significant, patient was labeled to have late onset Primary Hyperoxaluria. Anaemia in this patient has been attributed to chronic renal failure and bone marrow replacement by pericrystalline granulomata.

Hyperoxaluria may be primary, secondary or idiopathic. Secondary hyperoxaluria results from impaired renal excretion, excessive dietry intake of oxalate with ascorbic acid and ethylene glycol ingestion and increased absorption in patients with chronic inflammatory bowel disease. Primary hyperoxalurias (PH1 and PH2) are autosomal recessive disorders that result from inherited enzyme deficiencies in the liver. The degree of hyperoxaluria is marked, and stone formation typically begins in childhood.

Primary Hyperoxaluria (PH1) is a caused by deficiency of alanine glyoxylate aminotransferase (AGT), a hepatic enzyme that converts glyoxylate to glycine. Absence of AGT activity results in conversion of glyoxylate to oxalate, which is not capable of being degraded. Excess oxalate is excreted in the urine, causing kidney stones, nephrocalcinosis and kidney failure. As kidney function declines, blood levels of oxalate increase markedly and oxalate combines with calcium to form calcium oxalate deposits in the kidneys, eyes, heart, bones, and other organs, resulting in systemic disease.

Primary hyperoxaluria type 2 (PH2) is caused by deficiency of the hepatic enzyme glyoxylate reductase/hydroxypyruvate reductase (GRHPR). Absence of GRHPR activity results in excess oxalate and usually L-glycerate excreted in the urine leading to kidney stones and sometimes kidney failure. It is less common than PH1. Onset of PH2 is typically in childhood or adolescence with

symptoms related to kidney stones. Patients with PH2 appear to have less active stone formation and better preservation of kidney function when compared to patients with PH1. End-stage kidney disease is also less common and of later onset than in PH1 but once it happens oxalate deposition in other organs such as bone, retina and myocardium can occur.

Early diagnosis of oxalosis is of immense value because at a stage when renal failure has not set in, a proper management can arrest or at least delay the progress of disease. Liver function tests may be abnormal in advanced disease. Liver biopsy to demonstrate reduced enzyme activity is the confirmatory test. Molecular diagnosis, being non-invasive, is preferred if available. Long-term survival in patients is possible only with combined renal and hepatic transplantation. In patients who have already developed renal failure at the time of diagnosis of oxalosis, a combined liver and kidney transplantation offers the most effective treatment because the new liver will have the capability of producing necessary enzymes and the new kidney will excrete oxalates normally. Dialysis alone as a modality of treatment has been observed to be ineffective in retarding the disease progress because the amount of oxalate production almost always surpasses the amount removable by dialysis, thereby leading to a positive balance in favour of oxalate deposition.

References:

1. Hoppe B. An update on Primary hyperoxaluria. Nat Rev Nephrol.2012;8(8):467-75
2. Hoppe B, Beck BB, Milliner DS. The Primary hyperoxalurias. Kidney Int.2009;75(12); 1264-71.
3. Latta K, Brodeh L J : Primary hyperoxaluria type 1. Review Eu J Pediatr .1990; 149:518-522.
4. Lieske JC, Monico CG, Holmes WS, et al: International Registry for primary hyperoxaluria . Am J Nephrol 2005.May- Jun; 25(3): 290-296
5. Hoppe B , Langman CB : A united States survey on diagnosis, treatment and outcome of primary hyperoxaluria. Pediatr Nephrol 2003; 18: 986-991.
6. Alkhunaizi A and Chan L. Secondary oxalosis : a cause of delayed recovery of renal function in setting of acute renal failure . J Am Soc Nephrol . 1996 ; 7: 2321-2326.
7. Mashours , Turner JF Jr and Merrell R . Acute Renal failure, Oxalosis and Vitamin C supplementation . Chest 2000; 118 : 561-563.

8. Danpure CJ, Jennings PR: Peroxisomal alanine:glyoxylate aminotransferase deficiency in primary hyperoxaluria type I. FEBS Lett 1986;201: 20-24

9. Morgan SH, Purkiss P, Watts RWE, Mansell MA: Oxalate dynamics in chronic kidney failure. Comparison with normal subjects and patients with primary hyperoxaluria. Nephron 1987;46:253-257.

10. Hoppe B, Kemper MJ, Bokenkamp A, Langman CB: Plasma calcium-oxalate saturation in children with renal insufficiency and in children with primary hyperoxaluria. Kidney Int 1998;54:921-925

11. Milliner DS, Wilson DM, Smith LH: Phenotypic expression of primary hyperoxaluria: Comparative features of types I and II. Kidney Int 2001;59:31-36

12. Milliner DS, Eickholt JT, Bergstralh EJ, et al: Results of Long-Term Treatment with Orthophosphate and Pyridoxine in Patients with Primary Hyperoxaluria. NEJM 1994;334:1553-1558

13. Wong PN, Tong GMW, Lo KY, Law ELK, Wong AKM. Primary hyperoxaluria: a rare but important cause of nephrolihtiasis. HKMJ 2002; 8: 202-206.

14. Cochat P, Gaulier JM, Koch PC et al. Combined liver kidney transplantation in primary hyperoxaluria type1. Eur J Pediatr 1999; 158[suppl]: 575-580.

15. Bunchman TE and Swartz RD. Oxalate removal in type 1 hyperoxaluria or acquired oxalosis using HD and equilibration PD. Perit Dial Int. 1994; 14: 81-84.

16. Halil O, Farringdon K. Oxalosis: an unusual cause of leucoerythroblastic anemia. Br J Haematol 2003;12

ATYPICAL CHRONIC MYELOID LEUKEMIA WITH t(9;22) (P24,11.2), AND JAK2 GENE NEGATIVE

Tariq Mahmood Satti, Parvez Ahmed, Qamar un Nisa Chaudhry, Syed Kamran Ahmed, Mehreen Ali Khan, Raheel Iftikhar, Armed Forces Bone Marrow Transplant Centre, Rawalpindi – Pakistan

Abstract

We report here on a rare case of BCR-ABL1 and t(9;22) negative atypical chronic myeloid leukemia with sensitive to the tyrosine kinase inhibitors imatinib mesylate. At two years of follow-up, the patient showed complete hematologic response. Now at present his visceromegaly is reversed and bone marrow is in complete haematological remission.

Introduction

Chronic Myeloid Leukemia (CML) is the best described disease resulting from the t(9;22)(q34,q11.2). This chromosomal rearrangement leads to the well-known BCR-ABL fusion that promotes tyrosine kinase activity. Other oncogenic BCR fusions have also been found, such as platelet-derived growth factor receptor-alpha gene (PDGFRA) (4q12)and fibroblast growth factor receptor 1 (FGFR1) (8p12), which cause myeloproliferative disorders (MD).

The janus kinase 2 (JAK2) gene is one of the four members of the JAK gene family. The JAK2 V617F mutation which results from a G->T transversion at nucleotide 1849 in exon 14 of the JAK2 gene resulting in the substitution of valine by phenylalanine at codon 617, is associated with MD and is a major diagnostic criterion for primary myelofibrosis, polycythemia vera and essential thrombocythemia. A great number of chromosomal translocations involving the JAK2 locus have been described.

We report here on an extremely rare case of atypical CML that was found to be breakpoint cluster region (BCR)-Abelson (ABL) 1 and JAK-2 negative. This is a quite rare case reported in literature.

Case Report

In April 2013, a 28-year-old male patient presented with fatigue, abdominal pain and splenomegaly. A blood count revealed leukocytosis (90.38 x 10^9/L) with a predominance of neutrophils and a shift to the left. Hypercellular bone marrow with granulocytic and erythroid dysplasia was described. Conventional cytogenetic analysis was performed and a 46,XY karyotype was found (Figure 1) In view of the clinical picture, the result was interpreted as indicative of the presence of a BCR-ABL1 fusion gene, but this was not detected by reverse transcription polymerase chain reaction (RT-PCR). The presence of a BCR-ABL rearrangement was also ruled out by fluorescence in situ hybridization (FISH) using a BCR-ABL probe. In addition, no BCR/PDGFR FIP fusion gene or JAK2 V617F mutation were detected by RT-PCR. Therefore, the case was classified, according to the latest World Health Organization Classification, as BCR-ABL1-negative atypical CML.

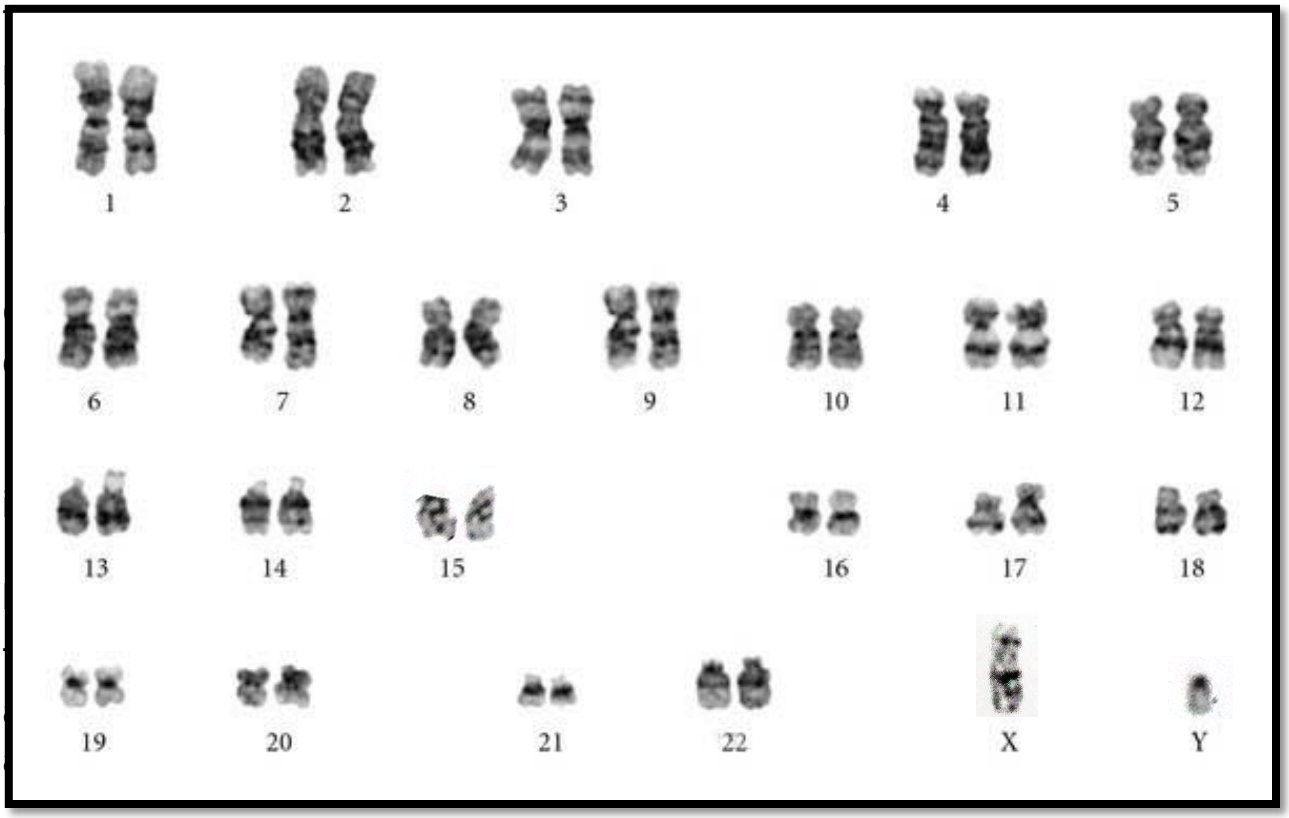

Figure 1 Conventional cytogenetics showing 46,XY karyotype

cases, five developed MF, two transformed into acute myeloid leukemia and three remained unclassified MPN. Only one of them was treated with imatinib, and the patient could not be followed-up. It is important to observe that in the

remaining cases the mortality rate was 70%. The factors includes promote tumorigenic properties and lead to increased cell survival in this disorder is still mystery.

It was not possible to define which therapy would be best because tyrosine kinase inhibitors may not be effective in all cases. Some authors suggest that in these cases it is important to investigate the role of interferon alone or in combination with TKI. We decided to submit our patient to TKI (imatinib) alone because he had no matched sibling donor.

Our case shows a rare t(9;22 and BCR/ABL negative patient with MD. This finding is unable to explain the tumorigenic activity seen in preclinical studies.

Footnotes

Conflict-of-interest disclosure: The authors declare no competing financial interest

References

1. Baxter EJ, Hochhaus A, Bolufer P, Reiter A, Fernandez JM, Senent L, et al. The t(4;22)(q12;q11) in atypical chronic myeloid leukaemia fuses BCRto PDGFRA. Hum Mol Genet. 2002;11(12):1391–1397.
2. Demiroglu A, Steer EJ, Heath C, Taylor K, Bentley M, Allen SL, et al. The t(8;22) in chronic myeloid leukemia fuses BCR to FGFR1: transforming activity and specific inhibition of FGFR1 fusion proteins.Blood. 2001;98(13):3778–3783.
3. Fioretos T, Panagopoulos I, Lassen C, Swedin A, Billström R, Isaksson M, et al. Fusion of the BCR and the fibroblast growth factor receptor-1 (FGFR1) genes as a result of t(8;22)(p11;q11) in a myeloproliferative disorder: The first fusion gene involving BCR but not ABL. Genes Chromosomes Cancer. 2001;32(4):302–310.
4. Thiele J, Kvasnicka HM, Orazi A, Tefferi A, Birgegard G. World Health Organization classification of tumours of haematopoietic and Lymphoid Tissues. Chronic myeloproliferative disorders treatment. 4. Lyon: International Agency for Research on Cancer Press; 2008.
5. Griesinger F, Hennig H, Hillmer F, Podleschny M, Steffens R, Pies A, et al. A BCR-JAK2 fusion gene as the result of a t(9;22)(p24;q11.2) translocation in a patient with a clinically typical chronic myeloid leukemia.Genes Chromosomes Cancer. 2005;44(3):329–333.

6. Cirmena G, Aliano S, Fugazza G, Bruzzone R, Garuti A, Bocciardi R, et al. A BCR-JAK2 fusion gene as the result of a t(9;22)(p24;q11) in a patient with acute myeloid leukemia. Cancer Genet Cytogenet.2008;183(2):105–108.

7. Lane SW, Fairbairn DJ, McCarthy C, Nandini A, Perry-Keene J, Kennedy GA. Leukaemia cutis in atypical chronic myeloid leukaemia with a t(9;22) (p24;q11.2) leading to BCR-JAK2 fusion. Br J Haematol.2008;142(4):503.

8. Elnaggar MM, Agersborg S, Sahoo T, Girgin A, Ma W, Rakkhit R, et al. BCR- JAK2 fusion as a result of a translocation (9;22)(p24;q11.2) in a patient with CML-like myeloproliferative disease. Mol Cytogenet.2012;5(1):23.

9. Tirado CA, Chen W, Huang LJ, Laborde C, Hiemenz MC, Valdez F, et al. Novel JAK2 rearrangement resulting from a t(9;22)(p24;q11.2) in B-acute lymphoblastic leukemia. Leuk Res. 2010;34(12):1674–1676.

10. Cuesta-Domínguez Á, Ortega M, Ormazábal C, Santos-Roncero M, Galán-Díez M, Steegmann JL, et al. Transforming and tumorigenic activity of JAK2 by fusion to BCR: molecular mechanisms of action of a novel BCR-JAK2 tyrosine-kinase. PLoS One. 2012;7(2):e32451.

ACADEMIC ACTIVITIES AND EVENTS OF PSH FORUM:

Keeping alive the tradition of annual PSH conference, 17th PSH Conference was held at Pearl Continental, Rawalpindi in March 2015. The conference was organised by Armed Forces Institute of Pathology (Haematology Department). The conference was well organised and was complete success. The main anchor person of this organisation was Maj Gen Saleem Ahmed Khan and the mentor was Maj Gen Mohammad Ayyub, HI(M). The some glimpses of the conference are shown below.

17th Annual Conference Pakistan Society of Haematology (PSH)

17th Annual Conference Pakistan Society of Haematology (PSH)

Dear Colleagues

We request you to join us in newsletter by sending your comments, short communications, case reports, issues of national interest, new developments in your departments, and scientific activities in your institutes. Your contribution is the back bone of this newsletter. It is requested that report/write up should be brief and concise. For information, suggestions, and correspondences please e-mail to tariqmahmood_satti@yahoo.com. In case you are a member and you are not receiving mails from us please update your postal and e-mail address urgently. You can find us at Website: www.psh.org.pk and Facebook: /psh.org.pk.

Brig (Dr) Tariq Mahmood Satti
Secretary
Pakistan Society of Haematology (PSH)