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CASE REPORT

Myeloid sarcoma of the urinary bladder with cutaneous tumour seeding after percutaneous suprapubic catheterization

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Abstract

Myeloid sarcoma (MS) is a rare extramedullary myeloid tumour. It has been reported in various sites, including lymph node, bone, skin, soft tissue, various organs and the CNS. It may precede or occur concurrently with acute myeloid leukemia. Urinary bladder involvement is extremely uncommon. We report a 70-year-old female who had MS of the urinary bladder, presented with frank and persistent hematuria associated with lower abdominal pain. She subsequently had tumour seeding in the abdominal skin via percutaneous suprapubic catheter. Tumours from both the urinary bladder and skin showed immature cells that were immunoreactive toward LCA (focal), MPO (strong), CD99 (weak) and CD117 (weak). Summary of cases in the literature is presented. The potential of its misdiagnosis and the useful markers for the diagnosis of MS are discussed.

Keywords: leukemia, myeloid sarcoma, urinary bladder, seeding, suprapubic catheter

INTRODUCTION

Myeloid sarcoma (MS) is a hematological tumour composed of immature granulocytic cells occurring in extramedullary sites. It is also referred to as extramedullary myeloid tumour, granulocytic sarcoma or chloroma. It may precede or occur concurrently with acute myeloid leukemia. The sites of occurrence include lymphoid organs, bone (skull, orbit, etc.), skin, soft tissue, various mucosae and organs, and the CNS.[1] A review of the literature showed only ten cases of MS of the urinary bladder described to date, and this is the first case to have spread to the abdominal skin via the suprapubic catheter. The important of this tumour is that it could be misdiagnosed as malignant lymphoma or high grade urothelial carcinoma.[2,3]

CASE PRESENTATION

A 70-year-old woman presented with one-week history of frank persistent haematuria and lower abdominal pain. There was no history of fever, dysuria, urgency or urinary incontinence. Cystoscopy in a district hospital with evacuation of blood clot was performed and reported as papillary growth at the bladder base with cystitis. Biopsy report was hemorrhagic cystitis. She had significant haematuria requiring blood transfusion. Ultrasound of the abdomen showed bilateral hydronephrosis. There was no renal or bladder stone. Fifteen months prior she was diagnosed to have myelodysplastic syndrome with refractory anaemia and excess of blasts. She is a known case of diabetes and hypertension on treatment with metformin 500mg BD and gliclazide 80mg BD. Subsequently, she was referred to our hospital for further management with a provisional diagnosis of suspected bladder cancer.

At our hospital, she again required resuscitation with blood transfusion. She was stable with blood pressure of 120/80mmg and pulse rate of 90/minute, but appeared pale. Blood investigations were as follow: white cell count ($3.8x10^3$/UL), red cell count ($3.64x10^{12}$/L), haemoglobin level (10.0 g/dL) and platelet count ($133x10^3$/UL). The differential counts: neutrophils (70.5%, $2.7x10^9$/L), eosinophils (0.9%), basophils (0.4%), lymphocytes (27.6%, $1.1x10^9$/L), monocytes (0.6%) and nucleated red blood cells (13%, $1x10^9$/L).

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In the emergency setting, percutaneous suprapubic cystostomy was performed in order to relieve painful urinary retention. Once stabilized cystoscopy and transurethral resection of bladder tumour (TURBT) was performed and which revealed extensive solid tumour over the right lateral and posterior walls surrounding to the right ureteric orifice. Within the first post-operative week, she had two episodes of clot retention requiring cystoscopy with clot evacuation before the bleeding ceased. Subsequently, the abdominal skin at the previous suprapubic catheter site showed a hyperemic and discharging lesion. A skin biopsy was taken. This was followed by bone marrow aspirate and trephine biopsy. The final histopathological diagnosis was MS of the urinary bladder. She recovered sufficiently and was planned for palliative chemotherapy with low dose Ara C and Myclotarg (Gemtuzumab).

Radiological findings

Ultrasound examination of the urinary tract showed an irregularly thickened bladder wall at both posterolateral regions, more on the right side, accompanied by bilateral mild hydronephrosis. The left proximal ureter was also dilated. There was no bladder stone.

Contrast enhanced CT of the abdomen and pelvis were conducted. This revealed multiple irregular sessile masses lining the dome, both lateral walls and the posterior wall of the urinary bladder (Figure 1A). At the posterior wall of the urinary bladder, the fat plane of the vesicouterine pouch was obliterated, suggestive of local infiltration. There are masses involve the left vesico-ureteric junction, with enhancement of the distal ureteric walls bilaterally, suggestive of infiltration of the distal ureters. Delayed CT of the pelvis showed contrast jets through the right ureteric orifice, but not on the left. There are also evidence of bilateral hydronephrosis and hydroureter. Subcentimetre pelvic and inguinal lymphadenopathy are noted. There was no evidence of metastases within the abdominal solid organs or the lungs.

In addition, linear irregular enhancement of the prevesical fat was seen (Figure 1B). This enhancing pattern was seen extending from the anterior margin of the urinary bladder base, through the rectus sheath and the subcutaneous fat to the skin anteriorly. A heterogeneously enhancing mass measuring 17.0 x 11.0 mm (anteroposterior x width) was seen at the skin of the suprapubic region. The striking linear enhancement of the fat spaces described was highly suggestive of enhancement of the subcutaneous track related to the previously inserted suprapubic catheter.

Histopathological findings

Microscopic examination of the bladder mucosal fragments showed immature cells infiltrating the lamina propria in sheets. These cells displayed large, round to ovoid and vesicular nuclei with prominent nucleoli (Figure 2A,B). Mitotic figures are frequently seen (40/10hpf).

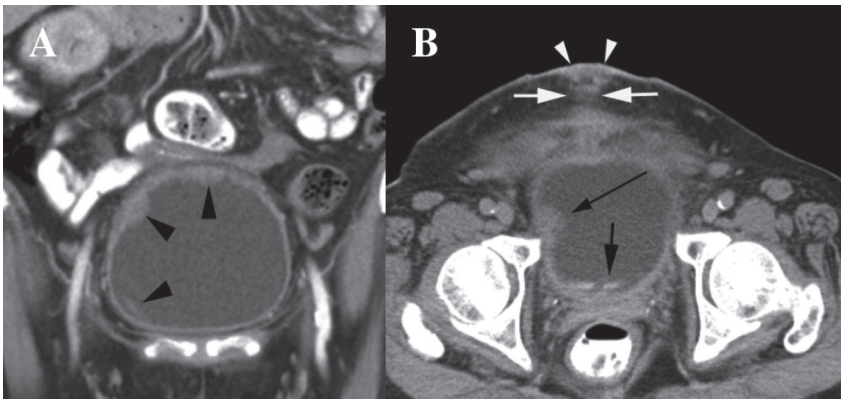

FIG. 1: (**A**) Coronal reconstructed CT of the urinary bladder. Irregular enhancing thickening of the walls of the urinary bladder at the dome & right lateral base are shown (arrowheads). (**B**) Axial contrasted CT of the base of the urinary bladder at the level of the superior tip of greater trochanters. Heterogeneously enhancing soft tissue is seen extending in a linear pattern from the anterior wall of the bladder base, through the prevesical space, rectus sheath, the subcutaneous fat (short white arrows) and leading towards a heterogeneously enhancing mass anteriorly (white arrowheads) at the skin. A mass at the right lateral wall of the urinary bladder is shown (long black arrow). Contrast layering from the right ureteric orifice is indicated (short black arrow).

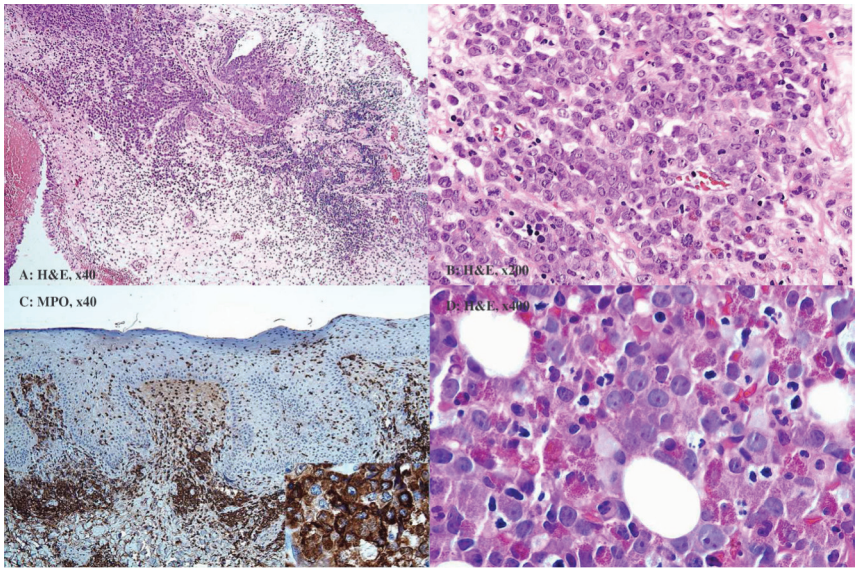

FIG. 2: Immature cells display large vesicular nuclei with prominent nucleoli infiltrating the lamina propria of the bladder mucosa (A) H&E x40 (B) H&E x200 (C) The immature cells in the skin expressed Myeloperoxidase (MPO x40). Inset (MPO x200). (D) Blast cells in the bone marrow trephine biopsy (H&E, x200).

Immunohistochemically, these cells are positivity toward leukocyte common antigen (LCA) (focal), myeloperoxidase (MPO)(strong), CD99 (weak), CD117 (weak), and are negative toward cytokeratin (CK), CD3, CD20, CD79a, PAX5, CD5, CD10, CD23, CD138 and CD4. Ki-67 showed 80% positivity.

Biopsy from the hyperemic area of the abdominal skin revealed similar morphology as the tumour in the urinary bladder. It was also MPO positive (Figure 2C), and was reported as myeloid sarcoma of the skin. Subsequently, bone marrow aspiration and trephine biopsy were performed and demonstrated acute myeloid leukemia. (Figure 2D)

DISCUSSION

Burns[4] was the first to describe this myeloid sarcoma as a collection of immature myeloid cells in 1811. It was later termed chloroma because it often had a green tint due to the presence of myeloperoxidase. This name derived from the Greek word chloros means green. It revised to granulocytic sarcoma in 1967 as it was recognized that not all such tumours were green in colour.

As MS is composed of immature or undifferentiated cells, this morphology could mimic a number of lesions which include large cell lymphoma, lymphoblastic lymphoma, Burkitt's lymphoma and high grade urothelial carcinoma. The misdiagnosis rate can be as high as 75% when there is no preceding hematological disorders.[2] The fact that this tumour is positive for leukocyte common antigen (LCA) may also be a diagnostic trap and result in the diagnosis of lymphoma. In as much as 33% (2/6) of cases, MS were not diagnosed at the initial biopsy. The diagnosis of MS requires a high level of suspicion when there is no preceding hematological disorder. Useful markers in the evaluation of MS include: Positive - CD34, CD117, TdT, Naphthol-ASD-chloracetate-esterase (Leder) and myeloperoxidase (MPO). Negative – B-cells (CD20, CD79a), T-cells (CD3, CD45ro), cytokeratin (CK). Microscopically, MS are medium to large-sized blastic cells displaying ovoid vesicular nuclei with medium-sized nucleoli and dispersed chromatin. Their cytoplasm is scanty to moderate.

Al-Quran et al[5] demonstrated inv(16)(p13q22) in both bone marrow and bladder with MS biopsy specimens. Thus the authors suggest the use of fluorescence in-situ hybridization (FISH) to detect inv(16) in cases where the bone marrow is negative for disease by morphologic and cytogenetic studies.

The potential complications of suprapubic catheterization are bleeding, infection, poor drainage, leakage around the catheter, bowel injury and incisional hernia. Tumour seeding in the abdominal wall via suprapubic catheter

TABLE 1: Summary of reported cases of myeloid sarcoma of bladder

Case	Age (years)	Gender	Initial diagnosis	Interval	Symptoms	HPE findings at the initial biopsy	Bone Marrow examination	Tumour descriptions	References
1	NA	NA	ML	NA	NA	NA	NA	Tumour in the bladder	Liu et al[8] 1973
2	29	F	None	NR	Hematuria dysuria,	NA	NA	80x70x60mm mass in the trigone	Chaitin et al[9] 1984
3	NA	NA	NA	NA	NA	NA	NA	NA	Merino Moreno et al[10] 1987
4	16	M	AML-M2	3 years	Hematuria	NA	NA	30x20mm mass at the left ureteral orifice	Cartwright et al[11] 1991
5	17	M	AML-M2	39 months	NA	NA	NA	NA	Bekassy et al[12] 1996
6	36	M	None	NR	Fatigue, pollakiuria, suprapubic pain, hematuria	Transitional cell carcinoma, grade 3. Suggestion of hematopoietic origin	No abnormalities	76x67x36mm solid polypoid mass at the left anterolateral wall	Aki H et al[3] 2002
7	80	F	Myelodysplasia with 10% blasts, RAEB	NA	Hematuria, dysuria	Myeloid blasts, neutrophils, hemosiderin-laden macrophages	Myelodysplasia with 10% blasts, RAEB	20x20mm solid mass in the left anterolateral wall	Kerr P et al[13] 2002
8	57	F	None	NR	Urinary incontinence and fatigue	Consistent with primary granulocytic sarcoma	No abnormalities	74x21mm solid mass in the trigone and base with extension to the ureter orifices	Hasegeli Uner A et al[14] 2004
9	47	M	None	NR	Haematuria, slight swelling of the right testicle and flank pain	Poorly differentiated malignant neoplasm	Cellular (50%), slightly increased in promonocytes, no increase in blasts	40x 30x20mm mass in the right posterior wall	Al-Quran SZ et al[5] 2006
10	71	M	Unclassified myeloproliferative or MDS	2 months	Hematuria	MS (immature myeloid cells)	Marked myeloid hyperplasia with maturation, no increase in blasts	Normal thickness of urinary bladder wall	Sonmez et al 2009[15]
11	70	F	MDS	15 months	Hematuria, lower abdominal pain	Hemorrhagic cystitis	AML	19x17x11mm in the both lateral, base and superior wall	Present case

AML, Acute myeloid leukemia; ML, Myelogenous leukemia; F, female; M, male; HPE, Histopathological examination; MDS, Myelodysplastic syndrome; NA, Not available, NR, Not applicable

is rare. Breul *et al*[6] reported similar tumour seeding in a case of squamous cell carcinoma of the urinary bladder. We advise caution when deciding on insertion of suprapubic catheter in this situation. Notably, Andersen *et al*[7] reported a case cutaneous tumour seeding of transitional cell tumour after laparoscopic biopsy of a bladder cancer.

Up to 2010, there were 10 other cases of MS of the urinary bladder in the published literature (Table 1).[8-15] Inclusive of this case, the ages of patients ranged from 16 to 80 years (mean, 47 years). The male to female ratio was 5:4 with a slight preponderance to male. The clinical presentation included hematuria (7/8, 87.5%), dysuria (2/8, 25%), fatigue (2/8, 25%), urinary incontinence (1/8, 12.5%), urinary retention (1/8, 12.5%), suprapubic pain (1/8, 12.5%), flank pain (1/8, 12.5%), lower abdominal pain (1/8, 12.5%) and pollakiuria (1/8, 12.5%). Six of the cases (6/10, 60%) had initial hematological disorders preceding the development of MS in the bladder. The interval between the initial diagnoses of hematological disorder till the development of MS ranged from 2 to 39 months (mean, 23.0 months). The tumour size ranged from 19 to 80mm (mean, 48.4mm) by radiological examination. The commonest location in the bladder was the trigone (2/8, 25%), base (2/8, 25%) and left anterolateral wall (2/8, 25%), followed by left ureteric orifice (1/8, 12.5%), both lateral walls (1/8, 12.5%) and right posterior wall (1/8, 12.5%). One had no mass in the bladder and the wall thickness was normal (1/8, 12.5%).

In conclusion, MS should be considered in the differential diagnosis in patients presenting with hematuria, especially with a preceding history of hematological disorder. However, since the absence of a history of hematological disorder can be as high as 40%, a high level of suspicion is needed to make a diagnosis. MS mimics include large cell lymphoma, lymphoblastic lymphoma, Burkitt's lymphoma and high grade urothelial carcinoma, and the use of immunohistochemical markers for blast and myeloid differentiation such as CD117, Naphthol-ASD-chloracetate-esterase (Leder) and Myeloperoxidase are helpful in its diagnosis.

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