A clinicopathological study of Xanthogranulomatous pyelonephritis

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Abstract

Introduction: Rare, severe and atypical form of chronic pyelonephritis characterized by destruction of renal parenchyma and the presence of granulomas, abscesses, and collection of lipid filled macrophages.

Objective: To study the clinicopathological relationship of the lesion.

Method: A 8 year retrospective study was done to analyze the lesions of renal and ureteric calculi. XGP was found to be most common in female.

Conclusion: Xanthogranulomatous pyelonephritis is unusual variant of chronic pyelonephritis. Preoperative diagnosis is desirable with laboratory analysis. Histopathological examination is important to know the type and etiological factor of the lesion.

Keywords: Xanthogranulomatous pyelonephritis, foamy macrophage

Introduction

Xanthogranulomatous pyelonephritis is rare type of chronic infective pyelonephritis being recognized as an important cause of renal morbidity worldwide. It now globally accounts between 0.6% and 1% of all pyelonephritis cases [1]. Inflammation destroys the renal parenchyma either diffuse (83-90%) or segmental and focal (together 10-17%) [2]. Clinically XGP presents with recurrent urinary tract infections resistant to antibiotics, fever, hematuria, dysuria, abdominal mass, palpable mass, anorexia and weight loss [4]. Often associated with Proteus infections and obstruction, the lesion sometimes produce large, yellowish orange nodules that may be grossly confused with renal malignancy [2]. The condition is usually unilateral and results in non-functioning kidney [3]. Hydronephrosis and renal calculi are often observed. Obstruction with Renal calculi causing parenchymal destruction and replaces with sheets of foamy macrophage, lipid laden macrophage (xanthoma cells), diffuse infiltration of plasma cells. XGP presented as a complication of renal transplant [5, 6] and also correlated with metabolic syndrome and diabetes mellitus [5]. The laboratory findings show leukocytosis, anemia, pyuria in urine analysis. E.coli. Proteus mirabilis are most common organism in urine culture others are S.aureus. Group B streptococci, Candida, klebsiella, and bactereoids [7, 8]. For better prognosis pre-operative biopsy can be performed and nephrectomy can be reduced.

Aims and objectives

- To study the clinicopathological correlation of Xanthogranulomatous pyelonephritis.
- To study age and sex wise incidence of XGP.
- To evaluate the organism causing XGP.

Materials and method

This study was conducted in Dept. of pathology, Tertiary care teaching hospital, Ahmedabad from June 2013 to May 2020. The clinical data was taken from the hospital records. The complete history and preoperative investigations including blood count, ESR, fasting blood glucose, renal and liver function test, urine examination, and urine culture and sensitivity were done. The radiological investigations ultrasonography and intravenous urography were noted. The nephrectomy specimen were processed and H&E stained sections were reviewed. Diagnosis was confirmed by histopathological examination. During this period, 15 nephrectomy specimen of XGP were analysed in detail by histopathologist. When diagnosis
of XGP was confirmed it was staged according to:

**Stage 1** - Lesion was confined to renal parenchyma  
**Stage 2** - Lesion involved the preirenal space  
**Stage 3** - Lesion was extended in perirenal space and pararenal spaces

**Results**

During the study, 15 cases of xanthogranulomatous pyelonephritis were reviewed. Among the 15 cases, 9 lesions (60%) were in female and 6 lesions (40%) with male to female ratio 2:3. The maximum no. of cases were identified in 4th decade (40%). Our youngest patient was 32 years and oldest patient was 68 years. History of urinary tract infection was noticed in all cases. Other symptoms were anorexia, pyuria, dysuria, proteinuria, weight loss and hematuria. 12 patients had hemoglobin less than 8gm/dl and polymorphs in 14 cases, ESR raised in 13 cases. In 7 cases the urine was sterile but pyuria was found in 6 cases. Proteus mirabilis and E-colI were the most common organism isolated from kidney after nephrectomy. Radiological examination shows multiple calculi in kidney in 6 cases and ureteric calculi with multiple calculi in kidney in 2 cases. In 8 patients’ right kidney was involved and in 7 cases left kidney was involved. Grossly kidney was enlarged, the cut surface showed diffuse cortical scarring with effacement of corticomedullary junction. In diffuse XGP the kidney was enlarged with hydronephrosis, pelvic calculi, single or multiple yellow nodules.

On microscopic examination, structure of kidney with presence of interstitial mixed inflammatory infiltrate, chiefly consists of neutrophils, lymphocytes, plasma cells, histiocytes surrounded by dense fibrous tissue. At places collection of foamy macrophages and foreign body type of giant cells are also seen. Focal and diffuse involvement of renal parenchyma. The interstitium showed microabscess, lymphoid aggregates with germinal centre formation. Intimal fibrosis of small to medium sized arteries with luminal narrowing, areas of hemorrhages. Majority of cases revealed involvement of renal capsule with extension to perirenal soft tissue.

**Stage 1** - 50-55% (8 cases)  
**Stage 2** - 25-27% (4 cases)  
**Stage 3** - 15-20% (3 cases)

**Table 1: Age and Sex wise distribution of cases**

<table>
<thead>
<tr>
<th></th>
<th>15-30</th>
<th>30-40</th>
<th>40-50</th>
<th>50-60</th>
<th>60-70</th>
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<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
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<tr>
<td>F</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>6</td>
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</tbody>
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**Table 2: Clinical Presentation - Number of Cases**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>15(100%)</td>
</tr>
<tr>
<td>Flank Mass</td>
<td>15(100%)</td>
</tr>
<tr>
<td>Anorexia</td>
<td>10(66%)</td>
</tr>
<tr>
<td>Weightloss</td>
<td>9(60%)</td>
</tr>
<tr>
<td>Pyuria</td>
<td>7(46%)</td>
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<tr>
<td>Dysuria</td>
<td>10(66%)</td>
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<tr>
<td>Proteinuria</td>
<td>12(80%)</td>
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<tr>
<td>Hematuria</td>
<td>6(40%)</td>
</tr>
</tbody>
</table>

**Discussion**

XGP is uncommon form of chronic pyelonephritis accounts for 6/1000 of surgically proved cases \[14, 15\]. Women affected more than male with M:F ratio 2:3 \[14, 15, 16\]. The present study correlated with above study. In present study 6 cases were secondary to calculi (40%).

In our study common finding were diffuse involvement of whole kidney with decreased and non-functioning kidney 6 cases (40%). The present study correlates with Haq nawaaz et al. 2005, D’Costa GK et al. 1990, Shauser JD et al. 1972. In present study most of the patients were anemic and presented with tender flank mass Haq nawaaz et al. 2005 Documented similar finding in his study. The preoperative diagnosis is very difficult. The possible diagnosis of XGP is possible by the clinopathological and radiological investigation. In present study findings were unilateral involvement, impaired and or absent renal function on affected side, presence of renal calculi, fever, anemia, luecocytosis, raised ESR, pyuria, hematuria and hypertrophy of non- affected kidney (contralateral kidney).
Our findings are consistent with Haq nawaaz et al. 2005, Toprak U et al. 2005, Ginjell JC et al. 1973. In present study all cases of XGP grossly yellowish nodules, with areas of necrosis and hemorrhage. Microscopy revealed focal or diffuse involvement with foamy macrophage, polymorphs, lymphoplasmacytic cells and focal abscess. Urine culture and preoperative fluid fluid collected from kidney showed E-coli, proteus mirabilis organism. The present study correlated with McDonald GS et al. 1981, D’Costa GK et al. 1990 and Nataluk EA et al. 1995. Renal malignancy is main diagnostic feature, evidence of chronic renal infection and microscopic findings were confirmed on XGP. The other renal inflammatory conditions like renal malakoplakia and megalocytic interstitial nephritis were differentiated from XGP, by the histology.

Conclusion
XGP is a rare manifestation of chronic renal parenchymal inflammation associated with chronic urinary tract infection and obstruction. It has to be differentiated from benign and malignant conditions. Evaluation of disease requires clinical presentation, imaging studies and biopsy for confirmation of diagnosis.

References
2. Robbins and cotran pathologic basis of disease (9e) volume II