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RESEARCH ARTICLE

LONG STANDING CALCULI AND RENAL MALIGNANCY

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ABSTRACT

Objective: The objective of our study was to document the histological type and morphology of neoplastic lesion found concomitantly with renal calculi. **Background**: Renal calculi is one of the most common urological condition. Chronic irritation induced by predisposing factors superimposed by infection is believed to induce squamous metaplasia. Subsequent development of leucoplakia and neoplasia in the urothelium stimulated RCC. The dismal prognosis of renal malignancy in patients with long standing calculi compelled us to study the clinicopathological presentation. **Methods:** In our series, we retrospectively examined records of about the nephrectomies done for long standing calculi with nonfunctional kidney in Pravara Rural Hospital, Loni during a span of 3 years from January 2018 to March 2021. **Results:** We analysed 30 cases of nephrectomies considering pre-op factors like age, gender, laterality of disease, radiological investigations ,method of determination of non functional kidney(USG,CT-IVP,DTPA), signs and symptoms of distant metastasis, type of nephrectomy and histopathological report of the nephrectomy specimens in patients with long standing renal calculi. 62.5% were males and 37.5% females. Right side malignancy was reported in 75% patients where as left side reported in 25% patients. 75 % patients underwent Simple nephrectomy whereas only 25% patients underwent radical nephrectomy for the same. Histopathological study 62.5% of the patients had squamous cell carcinoma 25 % of the patients had clear cell carcinoma,12.5% had urothelial Carcinoma with squamoid differentiation. Lymphovascular invasion was found in 37.5% of the patients. **Conclusions:** Our study has shown that malignancies associated with stone disease have insidious onset of clinical symptoms and there is a fair incidence of squamous malignancies. The possible way to improve prognosis is early diagnosis by screening patients of long standing urolithiasis with a CT scan in order to detect the associated malignancies. So the planning of appropriate early surgical intervention can be done and to improve the prognosis .

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INTRODUCTION

Renal calculi is one of the most common urological condition, while Renal cell carcinoma (RCC) encompasses a heterogenous group of cancers derived from renal tubuar epithelial cells. It is among 10 most common cancers worldwide, accounting for 2 % all cancer diagnoses and deaths. Major subtypes with > 5% incidence are clear cell RCC, papillary RCC and chromophobe RCC (1).

Clear cell accounts for majority of the deaths from renal cell carcinoma. Chronic irritation induced by calculi superimposed by infection is believed to induce squamous metaplasia. Subsequent development of leucoplakia and neoplasia in the urothelium resulting in RCC. The predisposing factors include renal calculi, infections, exogenous and endogenous chemicals, analgesic abuse which can cause chronic irritation and further metaplasia to dysplasia and leading to squamous cell carcinoma (2,11).

The possiblity of metaplasia, dysplasia leading to malignant change of RCC necessiates screening with CT. Although sometimes the renal neoplasms are identified postoperatively as they escape the clinical and radiological detection. Here histopathological examination plays a predominant role in confirming the presence of tumour with details of the histological type.(3) The dismal prognosis of renal malignancy in patients with of long standing calculi stimulated us to study the clinicopathological correlation. In this study we retrospectively analyzed the patient records who underwent nephrectomy at our hospital for non-functioning kidney due to long standing renal calculi. The objective of our study was to document the histological type and morphology of neoplastic lesion found concomitantly with renal calculi.

MATERIALS AND METHODS

This was a planned retrospective cross-sectional observational study using the records of the patients in Department of Surgery, Rural Medical college, Pravara Institute of Medical sciences, Loni. Records of 30 nephrectomies performed in our institute for the patients with non-functioning kidney due to renal calculi were taken. Variables that were studied included age, gender, clinical presentation, hematological, biochemical and radiological investigations, method of determination of nonfunctional kidney (USG, CT-IVP, DTPA), signs and symptoms of distant metastasis, type of nephrectomy and histopathological report. All the operative details were taken from operative notes. The histopathological reports revealing the type of renal cell carcinoma with grading, lymphovascular invasion and perineural invasion were noted.

Inclusion criteria: Records of 30 patients who underwent nephrectomy for nonfunctioning kidney due to renal calculi at Pravara Rural Hospital within 0-90 years of age.

Exclusion criteria: Patient undergoing nephrectomy for other causes.

RESULTS

Nephrectomy for non-functioning kidney due to renal calculi was performed on 17 males and 13 females with Male to Female ratio of 1.3:1 . The predominant clinical feature was flank pain in 28 patients. Nausea and vomiting as the 2nd most common presenting feature.12 patients had associated haematuria with the renal calculi.70% of the cases confirmed the previous known history of renal calculi with average duration of calculi to be 6 years. Careful abdominal examination revealed presence of the ballotable kidney in 13% cases. Routine urinalysis disclosed proteinuria in 58% of the cases. All the patients underwent ultrasonography as the primary investigation revealing large or multiple, staghorn calculi. Computed tomography for number, location, size of the calculi, any mass lesion preoperatively.30 patients who underwent nephrectomy had non-functional kidney with calculi on the affected side with the normal kidney on the other side as detected on the DTPA scan. 70% of patients had previous history of renal calculi and were under treatment for the same. 26% cases were reported to have concomitant findings of renal calculi with the malignancy. 62.5% were males and 37.5% females. Right side malignancy was reported in 75% patients whereas left side reported in 25% patients.

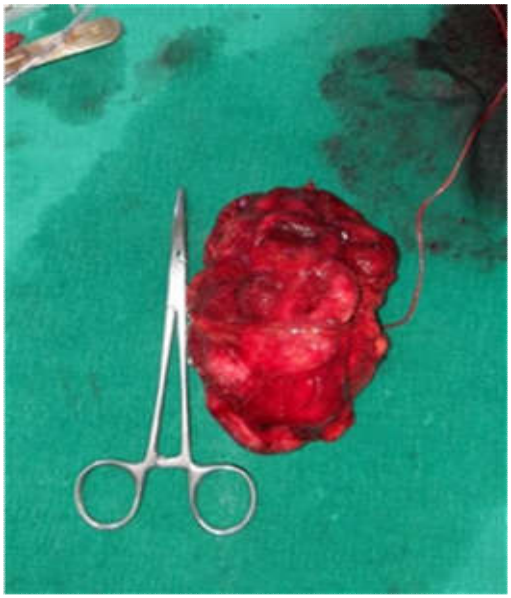

Fig 1. Gross specimen of kidney post nephrectomy for non-functional kidney

Pre-operative imaging diagnosed only 25% patients showing renal calculi with renal malignancy preoperatively. 75 % patients underwent simple nephrectomy whereas only 25% patients underwent radical nephrectomy. Histopathological study,62.5% of the patients had squamous cell carcinoma 25 % of the patients had clear cell carcinoma 12.5% had urothelial carcinoma with squamoid differentiation. Lymphovascular invasion was found in 37.5% of the patients. In one patient having urothelial carcinoma with squamoid differentiation had a high-grade tumour with lymphovascular and perineural inavasion. In the squamous cell carcinoma group,50% patients had poorly differentiated tumours with nodal involvement.

DISCUSSION

Primary malignancies of the renal collecting system are rare but most of them when detected tend to be malignant. In our study of malignancy with long standing calculi, there was male preponderance with male to female ratio of 3:2 which was in correspondence with the study done by Jain *et al* which showed male: female ratio of 3:1 whereas in studies by Gulshan Kumar Mukhiya *et al* showed female predliction (2,4).

Fig 2. cut section of kidney showing calculi

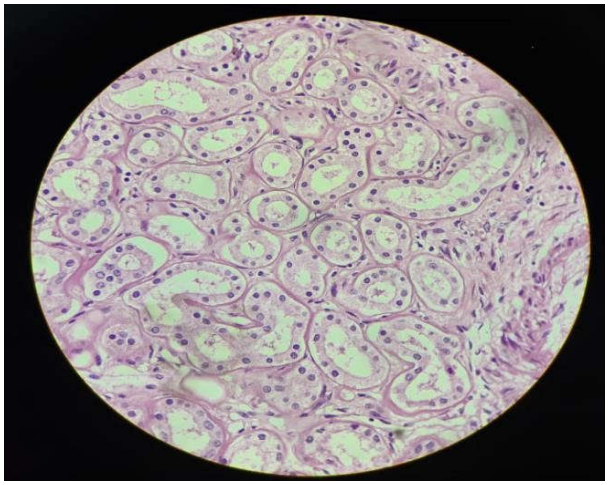

Fig 3. Histopathological image showing squamous cell carcinoma

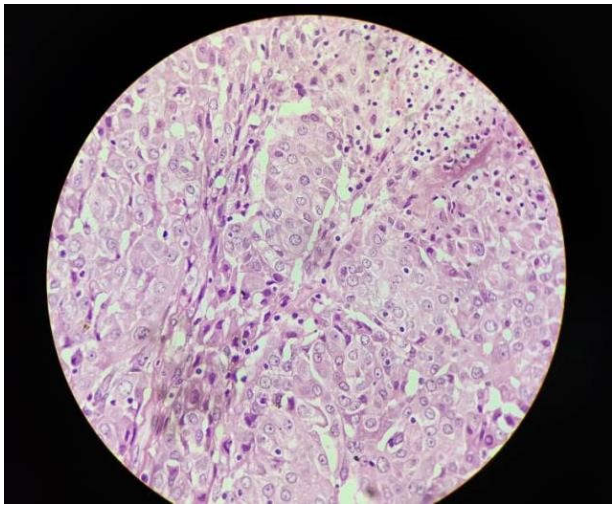

Fig 4. Histopathological image showing urothelial carcinoma with squamoid differentiation

The most common presenting symptoms in patients with renal calculi include flank pain, nausea and vomiting, fever, burning micturition, haematuria. In our study the most common presentation was flank pain followed by nausea, vomiting and fever. This was in concordance with the study conducted by Jain *et al*, Gulshan Kumar Mukhiya *et al*, Gond P *et al*, Shanmugasamy. K *et al*. (2,4,5,6) So hematuria as a clinical presentation should arise a suspicion of renal malignancy. Least common symptoms like bone pain and epigastric pain were seen in 3 patients (10% cases) which was similar to study by Aiman*et al*.(7) Previous history of renal calculi seen in 70% of the patients in our study was similarly seen in the study conducted by Jain *et al*, Jongyotha and Sriphrapradang.(2,10) Similar finding of Squamous cell carcinoma with history of long standing renal calculi was seen in case study by Dana Kivlin *et al*.(8) The ultrasound detected the renal mass along with large calculi in patients. The appropriate diagnostic imaging is CT abdomen and pelvis for tumour detection preoperatively. This necessitates the need of CT preoperatively in patients with history of long standing calculi. But being an expensive modality, it cannot be done in all the patients due to financial constraints. Renal malignancy was detected preoperatively in 25% of patients in a case series by Jain *et al* and colleagues which was similar to our study were renal tumour was detected on preoperative ultrasound and CT scan.(2) Histopathological study it was 62.5% of the patients had squamous cell carcinoma, 25 % of the patients had clear cell carcinoma, 12.5% had urothelial carcinoma with squamoid differentiation as seen in study by Hingway and Lodha where 60% cases showed Squamous cell carcinoma followed by papillary cell and transitional cell carcinoma.[9]Our study results lean towards possiblity of positive association of long standing calculi with renal malignancy but still further research on a large population is required to establish further association.

CONCLUSION

Our study has shown that malignancies are associated with stone disease. They have insidious onset of clinical symptoms. There is a fair incidence of squamous malignancies. The emphasis lies on the indispensable need of CT scan for earlier detection of renal calculi along with malignancy. As well as the prompt treatment of renal calculi which in the long run can lead to renal malignancy. So that the planning of surgical intervention is so as to intervene early and improve the prognosis. Screening and awareness about early treatment of renal calculi is needed so as to avoid its long term complications.

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