

Occult Spinal Dystrophy – An Etiological Factor for Urolithiasis? A Preliminary Communication.

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Abstract : On evaluating X-ray KUB (kidney, ureter & bladder) area of patients with urolithiasis in our lithotripsy department, it was found that many of them had spina bifida occulta. 330 X-ray KUB in the Urolithiasis category was compared with 296 normals for the evidence of Occult Spinal Dystrophy (OSD). Occult spinal dystrophy was present in 172 cases out of 330 in the urolithiasis category (52.12%). In the control group, the occult spinal dystrophy was present in 46 cases out of 296 cases (15.57%). The occurrence of occult spinal dystrophy in the stone group was statistically significant when compared to normal controls. An inborn neuromuscular anomaly of the urinary tract associated with occult spinal dystrophy may be an etiological factor for stone disease.

INTRODUCTION

Urolithiasis is a common problem affecting mankind, since antiquity. Though several theories are postulated and genetic and environmental factors are considered, often the exact cause of stone formation is still an enigma. Occult spinal dystrophy (Figure 1) is frequently associated with patients having urolithiasis, as is seen in the following study. It is postulated that an inherent, Urological neuromuscular/ neurophysiological abnormality occurs with occult spinal dystrophy and this may be one of the answers to the bewildering question of stone etiology.

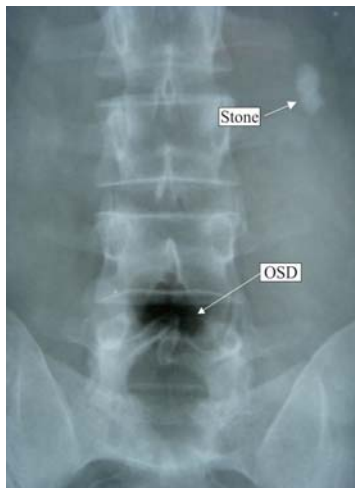


Figure 1

MATERIALS AND METHODS

At the K.J.Hospital, stone clinic and Lithotripsy Centre, kidney stones are treated with Extra Corporeal Shock Wave Lithotripsy (ESWL). During evaluation of the X-ray KUB area of the patients with urinary calculi, the principal author observed an increased association of Urolithiasis with occult spinal dystrophy. To study this finding in its entirety the x-rays of KUB region of the stone group vis-à-vis that of a control group were analyzed. Occult spinal dystrophy was defined as failure of union of the posterior arches of the Lumbosacral spine

at S3 and above. The X-rays were analyzed by two independent observers of occult spinal dystrophy and only cases identified by both observers as positive were counted as having occult spinal dystrophy for this study.

The stone group (Group-A) consisted of 330 adult patients comprising 273 males and 57 females, who had come to K.J.Hospital for treatment of Kidney stone by ESWL during the period, March 1989 to July 1991. The control group (Group – B) consisted of a series of 296 adult patients (191 males and 105 females) whose X-rays of the abdomen was taken at K.J.Hospital during the same period and who did not have any urological complaints.

The association of occult spinal dystrophy and Urolithiasis was tested using the statistical test, normal approximation to Binominal test for difference of two proportions.

RESULTS

In the stone group (Group – A) occult spinal dystrophy was present in 172 out of 330 cases (52.12%). The location of the occult spinal dystrophy was further classified depending on the Lumbo-sacral segments involved. Occult spinal dystrophy of first sacral vertebrae (S1) was the commonest abnormality, followed by S2 and S3. Overlapping abnormalities involving two or more segments were also seen. In the control group (Group – B), the occult spinal dystrophy was present in 46 out of 296 cases (15.57%). The association of occult spinal dystrophy and Urolithiasis was statistically significant Zcal 9.59 (Table – I).

Table – I: Statistical Comparison With Stone Group (Group A) & Control Group (Group – B)

Spinabifida	Stone Group – A	Control Group - B
Total	330	296
Present	172	46
Zcal		9.59
Ztab = 1.64 Significance at 5%		Significant

Further to this we have observed presence of RBC in urine microscopically in 148 cases with Occult Spinal Dystrophy which has got 100% correlation with Urolithiasis proven by X-ray KUB / Sonography. All these patients who had not come for complaints pertaining to Urolithiasis. Incidentally the X-ray of abdomen revealed OSD. Such cases we have screened the urine sample for microscopic

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presence of RBC and further screened by sonography of the KUB region. All of them showed stones ranging from 3 – 5mm, so there is a very strong correlation with OSD. Presence of RBC itself is confirmatory of microliths in the genitourinary system.

With the newly developed K.J. Ureteromyography Electrode which will give an abnormal pattern of impulse transmission in the pelvi ureteric system correlated with the time honored concept of internal triangle of urology (stasis, sepsis, stone formation). The asynchrony of pelvi ureteric impulse transmission and in these patients where the isotope study of the kidney, ureter and bladder has shown a continuous column of isotope in the ureters (Figure 2). In the normal ureter this is seen in segments only (Figure3).

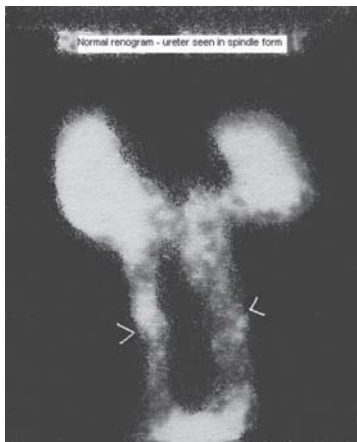


Figure 2

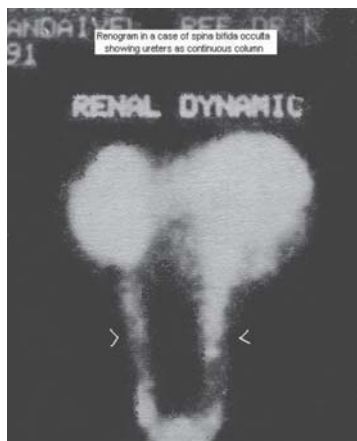


Figure 3

DISCUSSION

The incidence of occult spinal dystrophy ranges from 15-25% of the normal population in various studies. In a recent study by Boone¹ it was present in 22% of the normal population and was believed to have no clinical significance of its own. However studies have indicated an indirect association between Urological abnormalities and occult spinal dystrophy. Congenital malformation of the urinary tract in 13% of cases and X-ray appearances of hydronephrosis were manifested in 33% in one study². Neuro physiological abnormalities were noticed in a group of 37 patients, who were investigated for chronic retention and also they also had an increased incidence of occult spinal dystrophy though no direct casual relationship between radiological and neuro physiological abnormalities could be established. Upper renal tract changes were established in patients with occult spinal dystrophy. The changes were reported to be

more commonly associated with lesions of the sacral and lumbar regions³⁻⁵.

In our close observation in some patients who underwent lithotripsy, we have observed certain interesting findings. In two cases the double 'J' stent applied migrated in a retrograde fashion to the kidney, from the bladder. (Fig – 4) We have also noticed occasionally retrograde migration of whole stones to the kidney from the upper ureter or the pelvi ureteric junction, during the time interval between initial work up and subsequent ESWL stone localization. In some individuals with Spina bifida, who underwent isotope renogram (Dynamic study mode), the ureters contain urine in a continuous column rather than the spindle forms seen in normal individuals.



Figure 4

CONCLUSION

In the present study, increased incidence of stone formation in occult spinal dystrophy patients is noted. Our own observations and the other studies quoted above shows that there could be a neuromuscular abnormality in the urinary tract which may augment stasis, causing stone formation. There could also be a reversal of Electrophysiological gradient in the renal pelvis pacemaker region which may again hinder onward flow from the kidney downwards. The second part of the study determining the pressures at the various levels of the urinary tract in patient with occult spinal dystrophy and normal individuals to find out gradient reversal if any is in the offing. Evaluation of the cases of urolithiasis treated at our Hospital subsequent to the cases used for this study further strengthens our earlier observation, so much so occult spinal dystrophy can be considered a marker for urolithiasis.

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