# A Case of Osseous Metaplasia in the Uriner System Causing Severe Urinary Obstruction

## Şiddetli Üriner Obstrüksiyona Neden Olan Osseöz Metaplazi

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**ABSTRACT** Osseous metaplasia within urinary tract is a very rare entity. Nowadays the use of traditional imaging methods seems to be not sufficient to make differentional diagnosis of urinary tract stone to osseous metaplasia. The pathophysiology of heterotopic bone tissue formation was defined nearly hundred years ago. The renal Osseous metaplasia has been considered to be associated with mucosal injury, ischemia, trauma or carcinogenesis. An osseous metaplasia was detected on the ureter without any stone encrustation, so that the entity was thought to be the primary lesion. In our case we detected cristalloids surrounding the osseous metaplasia.

**Key Words:** Ossification, heterotopic; urinary tract; urinary calculi

**ÖZET** Üriner sistem içinde Osseöz metaplazi çok nadir görülen bir durumdur. Bugünlerde geleneksel yöntemlerin kullanımı ile üriner sistem taşı ve osseöz metaplazinin ayırıcı tanısı yetersiz kalmaktadır. Heterotopik kemik dokusunun oluşumunun patofizyolojisi yaklaşık yüz yıl önce tanımlanmıştır. Böbrek Osseöz metaplazisinin mukoza hasarı, iskemi, travma, ya da karsinogenez ile ilişkili olduğu kabul edilmiştir. Üreterde taş oluşmadan osseöz metaplazi geliştiği görülmüş ve onun primer lezyon olduğu sonucuna ulaşılmıştır. Olgumuzda, osseöz metaplaziyi çevreleyen taş kristalleri tespit ettik.

**Anahtar Kelimeler:** Osifikasyon, heterotopik; üriner kanal; üriner taşlar

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Urinary stones, stone formation in the bone metaplasia is a rare phenomenon may represent a nidus for the unusual. Osseous metaplasia within urinary tract is a very rare entity. Nowadays the use of traditional imaging methods seems to be not sufficient to make differentional diagnosis of urinary tract stone to osseous metaplasia. In this case we present right pelvi-ureteric obstruction by a stone that eventually defined as an osseous metaplasia.

## CASE REPORT

A 57 year old female, was admitted to the outpatient clinic with a complaint of right flank pain. The plain urinary system X-ray (KUB) and abdominal tomography revealed semi-opaque stone causing right ureteropelvic junction (UPJ) obstruction (Figures 1a,1b). The stone was 34 x17x17 mm in size that did not allow the passage of contrast material. There was severe dilation of the right collecting system and the size of the renal parenchyma was reduced.

**FIGURE 1a:** The plain urinary system X-ray (KUB) revealed semi-opaque stone.

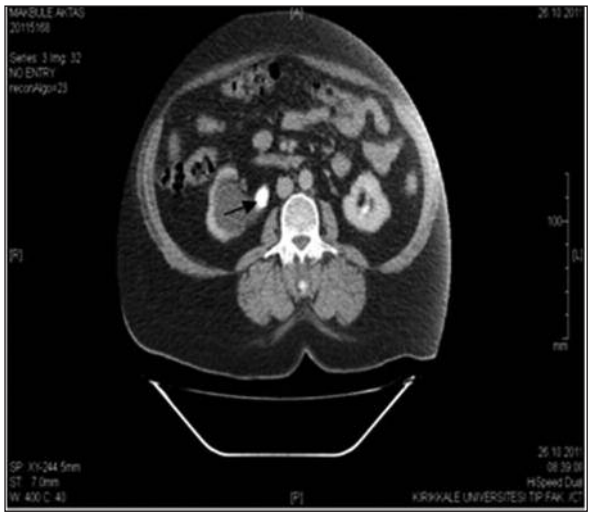

**FIGURE 1b:** The abdominal tomography revealed semi-opaque stone causing right ureteropelvic junction (UPJ) obstruction.

The findings of Tc 99m DTPA renal scintigraphy showed decreased blood supply, impaired concentration, prolonged excretion, hypoactive function of the total contribution of 22% of the right kidney. The patient has previously had urological surgery and extracorporeal lithotripsy (SWL). The patient was morbid obese (body mass index 45.8 kg/m$^2$) and had type 2 diabetes mellitus and medication controlled hypertension. The patient underwent right percutaneous nephrolithotomy operation. Endoscopic appearance was resembling urinary oxalate stone which was adherent to the wall of the UPJ. A slight capillary bleeding from the stone burden was noticed during the disintegration with pneumatic system. Careful evaluation revealed the soft tissue beneath the stone. The mass was completely removed with a stone grasper by detaching the tissue adherences. The operation was ended uneventfully and 6F J stent was placed antegradely. The histopathological examination of the mass revealed osseous metaplasia (heterotropic bone formation).

## DISCUSSION

Osseos metaplasia of the urinary tract was first described in renal pelvis and subsequently in ureter, bladder and renal calix by Phemister in 1923.[1] The pathophysiology of heterotopic bone tissue formation defined nearly hundred years ago. The renal Osseous metaplasia has been considered to be associated with mucosal injury, ischemia, trauma or carcinogenesis.[2] In a report, an osseous metaplasia detected on the ureter without any stone encrustation, so that the entity was proven to be primary lesion. The report also showed some adipose tissue juxtaposing the irregular trabeculated osseous tissue.[3] Similarly in another report, open ureterolithotomy revealed no urinary stone but osseous metaplasia.[4] In our case, bleeding from the underlying lesion during mechanical stone fragmantation suggested a soft tissue appearance and the tissue was taken out with a forceps. Final pathological report defined as lamellary matrix containing heterotropic bone formation. Fibro-adipose tissue was also shown inside the intertrabecular areas without any bone marrow cells. Focal calcification centers were demonstrated just periferally the osteoid matrix trabecules. Cristalloids was observed inside the osteoids and the chemical structure of these deposits was obscure. In some areas, fibro-vascular stroma was encirculating the osseous trabecular areas and there was no viable epithelial lining around the fragments (Figure 2).

The bone formation could occur throughout the urinary tract and Osseous metaplasia has occured as a result of urinary epithelium proliferation.[3] Trauma to

the ureter secondary to SWL, ureteroscopy, laser treatment or even in the presence of ureteral stents and metaplastic changes may be an etiological factor. Although there have been many suggested etiological factors, trauma has still been the main focus of interested of speculation.[3,4] Kagawa postulated that infiltration of polymorphonuclear cells with an increase in alkaline phosphatase and acid phosphatase activity resulted in ectopic bony tissue formation.[5] Who postulate that the development of bone metaplasia within the connective tissue of the urinary tract is the primary event. This ossification nidus may then perforate the urothelium and come in contact with urine. The direct and continuous action of urine on altered tissue induces bone formation by deposition of successive layers of lithiasic mineral bone formation can occur anywhere along the urinary tract. Of 1,693 calculi Cifuentes Delatte et al. found osseous tissue in 16 renal, 1 ureteral and 2 vesical calculi. However, all the reported renal extraossesous bone formation (EOB) was located in renal pelvis, calyx or along the urothelial layer.[2] Abdominal tomografi of a report case has shown extraossesous bone formation within the kidney parenchyma appearing as a calcified multiseptated mass. Laparoscopic partial nephrectomy was performed. Histopathologic examination revealed heterotopic bone formation with bone marrow in kidney.[6] In another a report 7 cases of bone tissue in the upper urinary tract. Routine excretory urography was suspicious for renal lithiasis. However, pathological evaluation of the kidney tissue revealed bone metaplasia in all 7 cases. Retrospective examination of the first 6 cases showed a typical radiological sign, consisting of a radiopaque eccentric halo surrounding an area of lesser radiological density that, in turn, connected with the urothelium. These findings permitted a correct preoperative diagnosis of bone metaplasia in case 7. Accurate preoperative differentiation of bone metaplasia (false calculi) and true renal lithiasis is important owing to the different treatments required.[7]

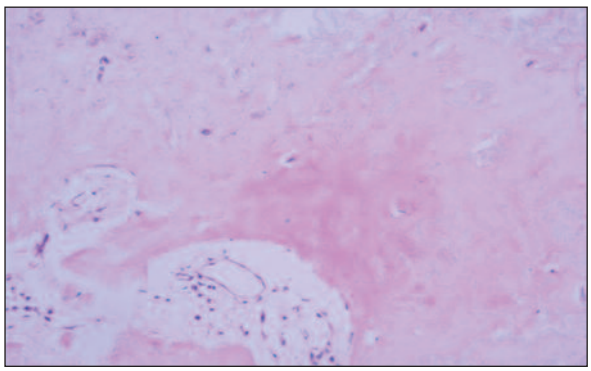

**FIGURE 2:** Focal calcification centers were demonstrated just periferally the osteoid matrix trabecules. Cristalloids were observed inside the osteoids and the chemical structure of these deposits was obscure. In some areas, fibro-vascular stroma was encirculating the osseous trabecular areas and there was no viable epithelial lining around the fragments (Hematoxylin&Eosin x200).
(See for colored form http://uroloji.turkiyeklinikleri.com/)

## CONCLUSION

In presented case, the plain urinary system X-ray and abdominal tomography revealed semi-opaque stone causing right ureteropelvic junction obstruction. In the presented case, during percutaneous treatment of obstructing urinary pelvic stone, the bleeding from the tissue underlying the stone coverage and soft tissue appearance, which come out easily with a grasper, made us thought the lesion as a calcified neoplasia. However, the exact nature of the tissue reported to be an osseous metaplasia. Since the contemporary treatment of urinary stones have been endoscopically, the osseous metaplasia should be kept in mind, when a bleeding calcified soft tissue detected.

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