

## Right Intrathoracic Kidney in An Adult: Case Report

### Erişkin Bir Hastada Sağ İnratorasik Böbrek

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**ABSTRACT** Intrathoracic kidney is a very rare abnormality and; only about 50 cases have been reported in the literature. Most of the reported cases are asymptomatic. We present a male patient with intrathoracic kidney without diaphragmatic hernia. A 24-year-old man with fever, cough, and malaise complaints for the previous two days was admitted to a district hospital's pulmonary medicine department. The chest X-ray revealed that the right hemidiaphragm was elevated. For further evaluation, computerized tomography was performed and a right intrathoracic kidney was detected. Since the patient was otherwise healthy with a normal functioning intrathoracic kidney, no medical intervention was considered. Periodic follow-up was planned. Intrathoracic kidney may not cause any symptom and may function normally even though it has a very long distance from the bladder. Intrathoracic kidney should be kept in mind in the evaluation of diaphragmatic elevation.

**Key Words:** Choristoma; kidney

**ÖZET** İnratorasik böbrek çok nadir bir anomali olup dünya literatüründe sadece 50 vaka rapor edilmiştir. Bildirilen vakaların çoğu asemptomatiktir. Biz bu makalede diafragma hernisinin eşlik etmediği bir inratorasik böbrek olgusunu sunmayı amaçladık. İki gündür devam eden ateş, öksürük ve halsizlik yakınmaları olan 24 yaşındaki erkek hasta bir bölge hastanesinin göğüs hastalıkları bölümüne müracaat etmiştir. Çekilen akciğer grafisinde, diafragma sağ yarısında yükselme dışında patoloji saptanmayan hasta ileri tetkik amacıyla hastanemize sevk edildi. Hastanın hastanemizde çekilen kompüterize toraks tomografisinde sağ inratorasik böbrek saptandı. Hastanın sağlıklı olması ve inratorasik böbreğin fonksiyonlarının normal olması nedeniyle hastaya herhangi bir tıbbi tedavi uygulanmadı. Hasta belirli aralıklarla takip programına alındı. İnratorasik böbrek mesaneden oldukça uzak bir mesafede olsa da, herhangi bir yakınmaya neden olmayabilir ve normal fonksiyon gösterebilir. Bu anomali diafragma yükselmesinin değerlendirilmesinde akıldta bulundurulması gereken bir durumdur.

**Anahtar Kelimeler:** Ektopik doku; böbrek

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**A**lthough ectopic kidney is a common abnormality, the displacement is usually downwards, towards, the pelvis, or medial. Upward displacement into the thoracic cavity is a much rarer finding, and most of the intrathoracic kidneys are found in males. About 50 cases have been reported in the literature.<sup>1</sup> A diaphragmatic hernia can be seen in 0.25% of cases.<sup>2</sup> In contrast to pelvic kidneys, intrathoracic kidneys are usually asymptomatic, and they are incidentally found on chest radiographs. In the ab-

sence of other renal pathologic features, it requires no surgical intervention.<sup>3</sup>

We present a male patient with intrathoracic kidney without diaphragmatic hernia.

## CASE REPORT

A 24-year-old man with fever, cough, and malaise complaints for the last two days, was admitted to a district hospital's pulmonary medicine department. The chest X-ray revealed that the right hemidiaphragm was elevated, with normal pulmonary parenchyma (Figure 1). Considering an upper respiratory infection, the patient was administered claritromycin 500 mg orally twice a day, and the patient's symptoms recovered. To clarify the cause of elevated right hemidiaphragm, CT scan of thorax was performed, and right intrathoracic kidney was detected (Figure 2) at transverse position over the liver, without any masses, renal calculi or hydronephrosis. Diaphragmatic hernia was not detected. For further evaluation, an intravenous pyelogram (IVP) and an MRI angiography were performed. IVP confirmed two normal functioning kidneys; however the right one was at intrathoracic localization, having a very long ureter without hydronephrosis (Figure 3). MRI angiography revealed that both renal arteries originated from their nor-



FIGURE 1: Elevation of right diaphragm at plain chest x-ray.



FIGURE 2: Right intrathoracic kidney on contrast-enhanced CT.



FIGURE 3: Right intrathoracic kidney on IVP.

mal localizations and the right renal artery was much longer than the left one (Figure 4).

The patient denied any urological or pulmonary symptoms, or a history of trauma. He was a healthy male before admission to the hospital. Since the patient was otherwise healthy with a nor-



**FIGURE 4:** Right intrathoracic kidney at coronal MIP (Maximum Intensity Projection) MR imagination.

mal functioning intrathoracic kidney, no medical intervention was considered. Periodic follow-up was planned. We concluded that the patient's initial complaints were due to the upper respiratory infection, and had no connection with the intrathoracic kidney.

## DISCUSSION

We have demonstrated a normal functioning intrathoracic kidney in a male patient with conventional and sophisticated radiological methods.

Renal ectopia is described as a kidney that is not located in its usual position. Ectopic kidneys are thought to occur in approximately 1 in 1000 births, but only about one in ten of these is ever diagnosed.<sup>4</sup> Intrathoracic kidney is a rare form of renal ectopia involving less than 5% of renal ectopias, and may be congenital or accompanied by a diaphragmatic hernia secondary to trauma or delayed closure of the pleuroperitoneal folds. Wolfrohm reported the first case of clinically diagnosed intrathoracic kidney in 1940. In 1987, Donat and Donat reviewed cases reported in the literature between 1922 and 1986, and according to the authors, the abnormality occurred more commonly on the left (62%) than on the right side (36%); moreover, 2% of the patients had bilateral intrathoracic

kidneys.<sup>2</sup> In addition, this anomaly is seen more often in males (63%) than in females (37%). Our patient was male and had right intrathoracic kidney without a diaphragmatic hernia.

The exact mechanism(s) of intrathoracic kidney is yet to be determined. Hawass et al. suggested that the final position of the kidney would be determined by part of nephrogenic cord that was resorbed after the initial wave of nephrogenesis.<sup>5</sup> Intrathoracic kidney without Bochdalek hernia is observed to be situated extrapleurally, in the paravertebral gutter. In this situation, the diaphragms are usually reported to be normal, and are adherent to the lower pole of the kidney.<sup>6</sup> Ureteric and renal vessels pass between the diaphragm and the vertebra towards the intrathoracic kidney. In our case, intrathoracic kidney was considered as congenital since there was no diaphragmatic hernia and the patient denied any history of trauma. Four basic types of intrathoracic kidneys have been described: 1- True thoracic ectopia with a normally developed dorsal diaphragm; 2- Eventration of the diaphragm; 3- Diaphragmatic hernia, either a congenital diaphragmatic hernia defect or acquired herniation; 4- Traumatic rupture of the diaphragm with renal ectopia.<sup>10</sup> Our case is compatible with the first type of the abnormality.

Various methods have been used to diagnose intrathoracic kidney and to differentiate it from other intrathoracic or mediastinal masses. Chest X-ray usually reveals a mass within the thorax. Sometimes diaphragmatic elevation might be the single sign of the disease, such as in our case.<sup>7</sup> After detecting a mass-like lesion or diaphragmatic elevation, a contrast enhanced CT scan is indicated for further evaluation, to disclose the nature of the pathology, and for the differential diagnosis. In addition, it can confirm lesions of the pelvis and calyces and reveals existence of a diaphragmatic hernia.<sup>8,9</sup>

In almost all reported cases, intravenous urography has been used as a routine method to determine the function of the ectopic kidney.<sup>5,7</sup>

In all cases, the kidney is located within the thoracic cavity and not in the pleural space, which is also true for our case. The renal artery, vein and

ureter on the affected side almost always exit the thoracic cavity through the foramen of Bochdalek, and are usually much longer than those in the normally situated kidney.<sup>1</sup> Our case showed almost all of the aforementioned features (Figure 3, 4).

Ectopic intrathoracic kidney rarely requires treatment. Treatment indications consist of obstruction or vesicoureteral reflux.<sup>1</sup> However, surgical exploration is mandatory in cases complicated by Bochdalek hernia. Since the patient did not ha-

ve any symptom attributable to normal functioning intrathoracic kidney, and was without any associated abnormalities, a periodic follow-up of the patient was planned.

In conclusion, intrathoracic kidney may not cause any symptoms and may function normally even though it has a very long distance from the bladder. Intrathoracic kidney should be kept in mind in the evaluation of diaphragmatic elevation.

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