

Editorial

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Medicine and Nephro-Urology in Ancient Iran: Part V: Al-Akawayni Notions in Kidney Diseases

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Abubakr al-Akawayni al-Bokhari (?-983 AD) was by far the most outstanding scholar and medical practitioner who collected one of the earliest medical laws. He was one of the greatest Iranian physicians of the fourth century whose medical works have been reliable references in most periods of the history of medicine. Akhawayani Bokhari was born in the city of Bokhara. Bokhara was an ancient Iranian city which is currently located in the Republic of Uzbekistan. It was also the residence of Avicenna and became one of the intellectual centers of the world during the Middle Ages. Abubakr al-Akawayni wrote *Hidayat al-Mutallimin fi-al-Tibb* (Learner's guide to medicine) in the closing decades of the 10th century. The *Hidayat* was a simplified book of medicine at the time providing a high level of medical knowledge and practice in the Samanid period [1,2]. This book was written in Persian or Farsi and was dedicated to his son and students of medicine. The *Hidayat* consisted of five major sections and 184 Babs (chapters). In his book, Akhawayni categorized useful knowledge on neuropsychiatry and was the first to describe sleep paralysis. He presented his descriptions of important disorders like "*Lisarghos*" (meningitis), mania, "*Malikhulia*" (psychosis) and "*Ghotrab*" (dementia). He also had a discourse on pulse disorders. The main chapters of the book addressed the kidney

and urinary tract anatomy, and kidney and urinary tract diseases, and there was a single closing chapter on uroscopy [3-5]. The aim of this article is to summarize some aspects of the *Hidayat* which are related to the kidney and urinary tract.

Anatomy of the kidneys and urinary tract

The kidneys are two, one on the right and another on the left side. Both kidneys are adjacent to the vertebral column and posterior muscles. Each kidney has a covering fatty sheet. The right kidney is longer than the left kidney. The kidney tissue is hard and homogeneous and its inside is hollow. Each kidney has two ducts; one of them is to the liver and another duct is to the urinary bladder [6]. Akhawayni's description of the size of the kidneys reflected the Galen's notion of the kidney function and circulation in which the blood was thought to ebb back and forth between the kidneys and the liver [7]. The urinary bladder is a muscular sac which is located between the rectum and pubic bone. The bladder wall consists of two layers. Urine comes to the bladder cavity from the kidneys through two urinary ducts named ureters. There is also a large muscle at the head of the bladder, which prevents involuntary urination. The ureter penetrates the bladder layers and reaches the neck of the bladder. The inner layer compresses to tighten the

urinary passage so the urine does not return back into the ureters. Later, these concepts were modified by Rhazes (Abu Bakr Muhammad Ibn Zakariya Razi). Rhazes disagreed with the presence of a valve in bladder at the insertion of the ureter. He believed that the oblique course of bladder muscle had a potential anti-reflux mechanism [7,8].

The main manifestations of kidney diseases

The diseases of the kidney are subdivided into functional and structural disorders. Functional disorders of the kidneys include polyuria and polydypsia, and structural disorders include stone and inflammations, renal weakness, and “Hozal” (atrophy). Inflammation of the kidneys and urinary tracts causes Khoon Raftan (Hematuria) and Rim Raftan (Pyuria). Pus excretion with the urine from the urethra makes urination difficult (dysuria). Kidney involvement in the warm temperament manifests itself as intractable thirst, excessive drinking (polydypsia), and frequent urination. In this situation, the urine becomes as clear as the water in the river because the urine does not stay enough in the kidney to concentrate and acquire color. The warm kidney required more water. This disease is known as “*Bar Miz*” in Persian, “*Dawarrah*” in Arabic, and “*Diabetes*” in Greek. As time goes by, the kidneys weaken and the urine comes out sanguineous or bloody. The patient suffers back pain and decreased sexual drive (libido). When the inflammation becomes more severe, the patient experiences heaviness and pain in the kidneys, the urine becomes scanty and colorless, and the extremities become swollen (anasarca edema). If the kidneys become slender (atrophic) the body becomes lean (cachexia), the sexual drive is lost, the urine increases and becomes transparent, and the back hurts. What he refers to as renal atrophy (*Hozal*) suggests end-stage kidneys with the onset of cachexia, polyuria, and swellings [6].

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