

Variations in renal arteries in human cadaver

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Abstract

Renal arteries supply blood to the kidneys. Over 2 million people dies every year out of kidney failures. Urologist has taken huge interests in the study of variations of renal arteries. Out of 8 sampled unpreserved cadavers, 15 kidneys are used for the study. 66.6% main arteries are seen to subdivide into single posterior and anterior arteries. 6.6% shows one posterior and three anterior renal arteries. 13% of the sample shows second order branches which are segmented. 13 out of the 15 kidney shown presence of anterior renal arteries, which forms 87% in the constitution. The study clearly shows that the vascularity of the kidney varies in their anatomical formations.

Keywords: kidneys, renal arteries, human cadaver

Introduction

Kidney diseases have been on the rise in recent years. Over 2 million people die every year from kidney failures. Renal arteries supply blood and other materials to the kidney, which is a retroperitoneal organ. As a result of the serious kidneys brings to people, the study of variations in renal arteries has been of great interests to urologists. Anomalies experienced in the renal vessels in human cadaver are wide and comes with serious consequences (Ilke, A. *et al.*, 2009) [2]. The orientation, locations, complete absence, and aberrant origin form some of the abnormalities that pose great health risks to patients. How the renal arteries vary from one human cadaver to another is what the report focuses on. Intravenous Pyelography (IVP) used before made simple investigations, but now with technological advancements, better imaging methods are used. Methods like, Scintigraphy, and arteriography are used to study some of these abnormalities.

The environment one is in, or the genetical defects contribute to the formations of renal blood vessels that are not developed properly (Klatte, T. *et al.*, 215) [6]. As this is the known causes of malformed renal arteries, etiology done indicates that most of these causes are not known, (Anderson K. *et al.*, 2007) [1]. How different renal arteries are in some selected human beings compares is studied. Their formations and states of operations. Some of the causes and effects of the selected evaluated and discussed. Possible cures and lifestyles people should adopt

Materials and Steps Used

The study focuses on eight cadavers that had not been preserved with anything. 15 kidneys were taken. The aorta from the abdominal segment together with the kidneys were taken too. CT scans done, shown clear states of the different renal arteries (Turba, U. *et al.*, 2009) [10]. Both the intrarenal arteries and anterior renal arteries and their formations and current states at deaths are shown. Huge differences are noted in some bodies of the two parts within the same body.

Different bodies show differing health states. The samples picked is representative as it brings out all the aspects of variations expected for the report, (Rocco F. *et al.*, 2015).

Main Renal Arteries

The CT scans taken shows that 66.6 percent of the sampled kidney, their main arteries subdivided into single posterior and anterior branches. The other samples making 6.6% shown presence of one posterior artery and three anterior arteries. All the four arteries were four - first-order arteries. The second order branches characterized by four segmented arteries were conspicuous in only 13 percent of the samples. The majority of arteries dominate most of the parts making up the kidney. This also explains why they take major roles to do with the operations going around. On this count, they are the ones that fall to problems of damages and defects as a result of external destructions coming from what a person eats on is exposed to or how they are mad initially to withstand interferences from forces coming from the outside.

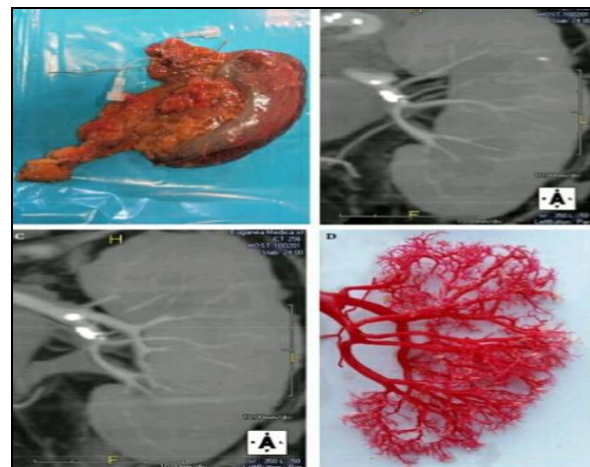


Fig 1: A, is an isolated right kidney, B, C is a CT scan of the same kidney, and D, vascular casts of the same.

Anterior Renal Arteries

Anterior renal artery as detected in many of the samples. 13 of the 15 kidneys being investigated showed these arteries. It, therefore, is shown that these forms the most numbers of arteries making up the kidney. Their percentage in composition was 87%. Five kidneys 33%, showed a two - second-order branches anterior renal kidneys, while the standing at the same 33% showed a three - second-order branches (Kallingal, G. *et al.*, 2012). 20% showed a five-second branches features. As it has always been, these anterior renal arteries are equally attacked by various conditions that affect their operations and workability especially by the

genetic formations as well as the environment one is growing in (Kang, W. *et al.*, 2013). If one is an environment where they are exposed to salty water and consumes food materials that keep the kidney busy mostly, these arteries become weak in time and the long run they may decline in providing adequate services that they are supposed to do. At this time, the kidney develops problems that should be looked at. Other times machines are employed at intervals on the patient's body to act as these vessels and provide what they were not able to provide. At this stage, transplant or entirely dependence on machines for operation becomes a reality for the owner.

Table 1: Distributions of Arteries in the selected samples. (L, Left, R, Right, M, Male, F, Female)

Cast number (Side)	Kidney sizes, cm	Sex cadaver	Age of cadaver, years	First-order arteries, n		Second-order arteries coming from anterior branch, n
				Anterior	Posterior	
1 (L)	11 × 6.2	M	80	1	1	4
2 (L)	12 × 6.3	M	63	2	1	5
3 (R)	11.8 × 6.2	M	63	1	1	2
4 (R)	11 × 6.1	F	69	2	1	5
5 (L)	10.5 × 5.8	F	69	3	1	3
6 (L)	10.8 × 5.8	F	87	2	1	5
7 (R)	11 × 6.3	F	55	1	1	3
8 (L)	10.7 × 6	F	55	1	1	4
9 (R)	10.8 × 6.2	F	87	1	1	2
10 (R)	11.7 × 6.5	F	47	1	1	2
11 (L)	11 × 6	F	47	2	1	2
12 (L)	11.2 × 6.2	F	67	1	1	3
13 (R)	15.5 × 6.3	F	67	1	1	3
14 (L)	11.6 × 6	F	72	1	1	2
15 (R)	11 × 6.2	F	72	1	1	3

Posterior Renal Artery

The posterior side forming the kidney forms the home to renal arteries (Raghavendra V. & Telkar A., 2012) [8]. On these surfaces, they forms segmented branches too. The Graves' models show that for any renal artery that is segmented is served or connected to at least one segmented artery (Kamali, K. *et al.*, 2012) [4]. But, in our case of study, two at more segmented arteries were seen present in the 80% of the

kidneys that were studied. This show how interconnected posterior renal artery is to the other renal artery. Their functions are dependent on the performance and operations of the other arteries within the kidneys. However, they are very important as they ensure that, the entire system is in place and working, they complement other arteries, (Shao P. *et al.*, 2012) [3].

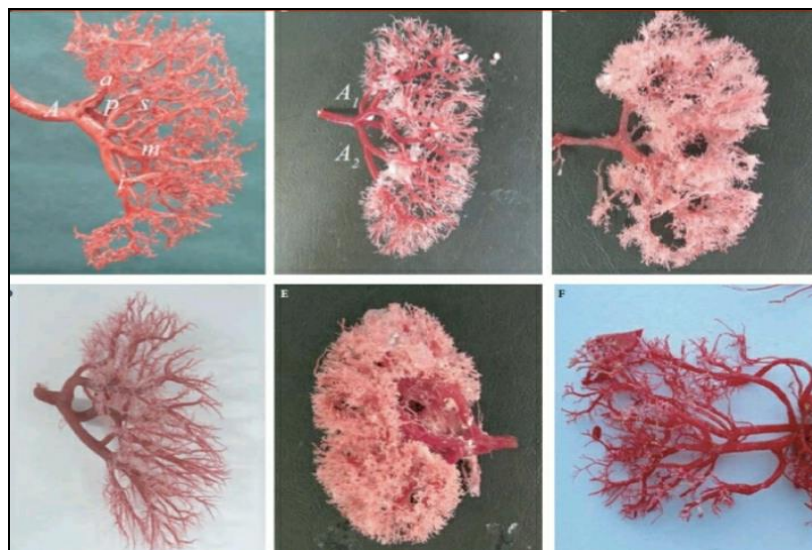


Fig 2: branching parts to the renal arteries.

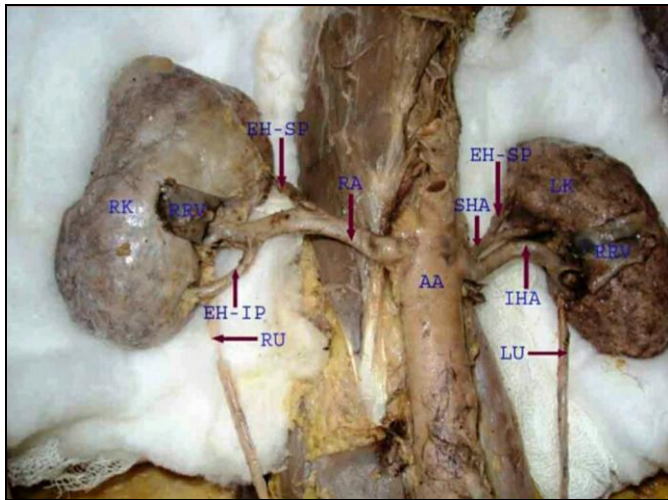


Fig 3

Conclusion

The vascularity of the kidney varies in their anatomical formations. Renal arteries exist in multiples which varies in size, locations, and functions. These variations in renal arteries are key as they should be used while carrying out surgery involving kidneys and surrounding organs.

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