Abstract

Introduction

The increased frequency of surgical as well as interventional radiological procedures involving the kidneys and the renal vasculature has shown a definite demand for a re-evaluation of the renal vasculature and its variations.

Objective

To assess the anatomy of the renal vasculature and to perform a morphological and morphometric analysis of the renal vessels.

Methodology

382 human cadaver kidneys collected from post-mortems were carefully dissected and morphological and morphometric analyses were performed on the reno-vascular system. Lengths of the vessels were measured with a vernier caliper. Diameters were measured using a Leica MZ6 stereomicroscope with Eye Piece Graticules. The data was analyzed utilizing SPSS 11.0 for windows software package.

Results

31.94 % of the kidneys had multiple renal arteries. Mean renal artery length on the left side was 4.70 cm (SD = 0.995) and that on the right was 5.76 cm (SD = 1.233) ($P < 0.05$). Mean renal artery diameter on the left side was 0.349 cm (SD = 0.123) and that on the right was 0.347 cm (SD = 0.090) (P = 0.897). Distances from the origin of the renal artery to the origin of the coeliac trunk and the superior mesenteric artery respectively on the left were 2.47 cm (SD = 0.553) and 1.454 cm (SD = 0.412) and the same on the right side were

2.542 cm (SD = 0.780) and 1.443 cm (SD = 0.617) ($P > 0.05$). There was no significant difference in the number of branches given off from the renal arteries on the left and right sides. ($P = 0.242$) Pre-hilar segmental branching was seen in 29.46% of the main renal artery. Only three additional renal arteries (2.29%) had pre-hilar segmental branching.

With regard to the renal veins, 95.8% of the kidneys were drained by a single renal vein. Rest of the kidneys had two renal veins. The renal vein length varied from 1.50 cm to 9.50 cm with the mean value on the left being 6.656 cm (SD = 1.163) and that on the right 3.259 cm (SD = 0.795) ($P < 0.05$). Renal vein diameter at its termination was 0.946 cm (SD = 0.353) and at the hilum was 0.724 cm (SD = 0.227). There was a significant difference in the diameters on the two sides. ($P < 0.05$) Length of the branch free distal segment of the renal vein ie. from the point of union of the suprarenal vein to its termination ranged from 1.10 cm to 4.50 cm with a mean value of 2.559 cm (SD = 0.745). Renal vein diameter at the point of union of the suprarenal vein ranged from 0.573 cm to 1.40 cm with a mean value of 0.999 cm (SD = 0.189).

Discussion

Our findings are of importance to the renovascular and transplant surgeon as well as to the interventional radiologist who performs angioplasty, embolization and stenting.