SUMMARY

Background: The intra-abdominal part of the testicular artery extends from the aorta to the internal inguinal ring and displays frequent variations in the site and angle of origin, number, course and branching pattern. These variations may be as high as five-fold in some populations as compared to others and have been identified as possible causes of iatrogenic injury during retroperitoneal surgery. The prevalence of these variations in the Kenyan population however remains unknown. The intra-abdominal part of testicular arteries is long and straight, with a smaller diameter than the aorta and a variable angle of origin. This part receives blood at high pressure and has a sharp kink towards its end. These factors influence its structural organization, which is yet to be elucidated. Adequate knowledge of this structure may be used in designing prosthetic vascular grafts.

Objective: To describe the topography and structure of the intra-abdominal part of testicular artery in a sample of the Kenyan population.

Study design: Descriptive cross-sectional study.

Materials and methods: One hundred (100) testicular arteries were used in this study. They were obtained from the Department of Human Anatomy, University of Nairobi and Kenyatta National Hospital Mortuary. Standard midline abdominal incisions were made, flaps of the anterior abdominal wall reflected and the intestines and mesentery were retracted systematically to expose the parietal peritoneum of the posterior abdominal wall. The testicular arteries were identified through the peritoneum and their angles of origin were measured using a goniometer.
The peritoneum was then carefully incised to access the testicular arteries. Their number, course and branching pattern was noted. Five-millimetre sections were then taken for routine histological processing from the proximal, middle and distal segments of the intra-abdominal part of fourteen testicular arteries. Staining was done using Haematoxylin and Eosin, Mason’s Trichrome and Weigert’s method. The data collected was analysed using the Statistical Package for Social Sciences (version 21.0, Chicago, Illinois). A P-value of <0.05 was considered statistically significant at 95% confidence interval. The results are presented using tables and photomicrographs.

**Results:** Out of the one hundred testicular arteries studied, thirty three (33%) displayed a variant anatomy which included their site of origin, number, course and branching pattern. Eight (8%) originated from an accessory renal artery, four cases (4%) of duplication were noted, five (5%) arched over the left renal vein, eight (8%) were retrocaval and one (1%) had a retroureteric course while seven (7%) bifurcated within the abdomen. The level of origin along the aorta varied from 1 centimetre above the renal arteries to 5.5 centimetres below them while the vertebral level of origin ranged from T12 to L4. The mean angle of origin was 55.17± 17º and 74.71±28.58 (p=0.202) on the left and right respectively. The intra-abdominal part of testicular artery was found to be a typical muscular artery that displayed zonation of the media and adventitia throughout its length. The inner zone of tunica adventitia had longitudinally oriented smooth muscle cells. Intimal cushions were present in the proximal and distal segments only.

**Conclusion:** There is a high prevalence of variant testicular arteries in the Kenyan population sampled. This calls for extra caution during surgical procedures in the posterior abdominal wall. It is proposed that the zonation of tunica media and adventitia as well as the presence of longitudinally oriented smooth muscle cells in the latter may contribute part of the mechanism
that regulates testicular temperature by regulating blood flow to the testes. This organization may also contribute to the mechanical strength of the arterial wall to enable it withstand the forces generated by an almost vertical column of blood in the intra-abdominal part of the testicular artery. Additionally, the low incidence of testicular artery aneurysms may be partially explained by this unique structural organization.