

Growth dynamics of the renal and suprarenal arteries in human fetuses

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The kidneys and suprarenal cortex are of common embryonic origin. The suprarenal gland and kidney have a common pathway in angiogenesis. Each of the organs is of key importance for intrauterine and individual development, yet they vary greatly in growth dynamics throughout pregnancy. The authors compared the arterial supply of these organs quantitatively in respect to foetal age and sex.

key words: foetus, growth, suprarenal artery, renal artery

INTRODUCTION

Angiogenesis in the extraperitoneal space in the abdomen involves the ascending of the kidney, the descending of the gonads and the rapid growth, intensive activity and slight descending of the suprarenal gland [3, 5, 7]. Subsequent segmental dorsal arteries are incorporated during the ascending of the kidney up to the lowest of the suprarenal arteries (Fig. 1).

The aim of the study is to present trends in the volume of the renal and suprarenal arteries.

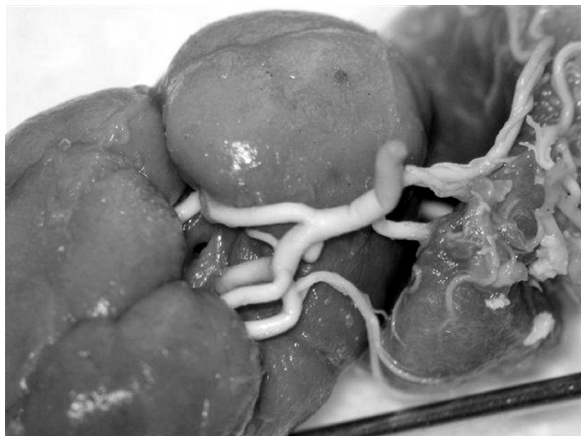


Figure 1. Latex alloy of the renal and suprarenal arterial pedicle.

MATERIAL AND METHODS

Digital scaled pictures were used for computerised analysis, performed with the use of vector graphics, of the plane measurements and volumetry of the renal and suprarenal arteries of human fetuses. A total of 30 spontaneously aborted or prematurely delivered fetuses were dissected. The age was estimated by the means of manual foot length measurements according to Sampaio's and Ambrosio's studies [6]. The arterial system of the fetuses was primarily filled with LBS latex suspension (Fig. 1).

RESULTS

The different patterns of vascularisation were simplified to a dominant stem volume and its primary branch, according to dichotomous division. A slight acceleration of the volume in the renal arteries was observed, while the suprarenal arteries had a more stable volume (Fig. 2). This trend was mostly displayed in the older fetuses. No differences were observed between the left and right arteries. Sexual dimorphism was not recorded.

DISCUSSION

The segmental dorsal arteries of an embryo primarily supply the mesoderm bud, giving rise to the

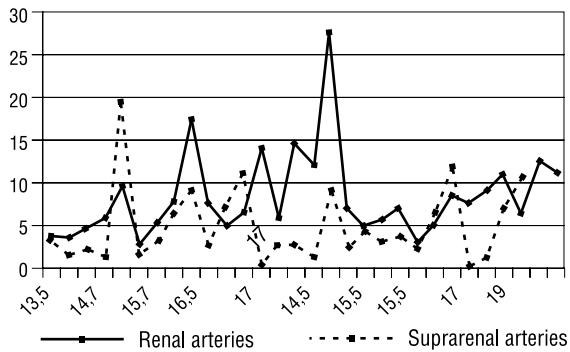


Figure 2. Volume of the renal and suprarenal arteries.

further development of the organs, and is species non-specific [3, 5]. The rapid growth of the suprarenal cortex, combined with the descending of the gland and its endocrinal activity, require intensive blood flow; which is ensured by the 3 groups of arteries: the superior, the middle and the inferior [2, 4, 5]. The ascending kidney finally approaches the suprarenal gland and incorporates the lowest of the suprarenal arteries [1–3] (Fig. 3). The intensive growth of the kidney gives way to the renal artery to dominate in the system of renal and inferior suprarenal arteries (Fig. 4). Both complete fusion, and different stages of incomplete fusion were observed.

CONCLUSIONS

The renal arteries show greater dynamics in 13–19-week-old fetuses than do the suprarenal arteries. This may indicate differences in the growth and metabolic activity of the organs.

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Figure 3. Inferior suprarenal artery (arrow) branching from the renal artery of a foetus.



Figure 4. Inferior suprarenal artery and renal artery of a foetus (sagittal plane).

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