

Modified Blalock-Taussig-Shunts: Histopathology and Morphometry

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Objective: Surgical implantation of modified Blalock-Taussig-Shunts (mBTS) is a standard procedure to maintain pulmonary blood supply in cyanotic congenital heart defects. We are presenting results from histopathological work-up of a series of human explanted mBTS made of Gore-Tex fabric.

Materials and methods: Explanted mBTS (n = 9) were processed using a uniform protocol after surgical removal from pediatric patients with congenital heart disease (age at implantation 2 days to 4 months; time interval between implantation and explantation 4 months to 5 years). The specimen were fixed in formalin and embedded in paraffin or in methylmethacrylate. We performed standard staining, immunohistochemistry, and morphometrical analysis for quantification of pseudointima formation.

Results: On gross examination, mild to moderate proliferation of pseudointima was seen within the lumen of the mBTS in 7 of 9 patients. Two of the shunts showed marked focal narrowing. The degree of pseudointima formation correlated positively with the implantation time. Superficial cells stained positive for von Willebrand factor (vWF) thus demonstrating complete endothelialisation. Neo-tissue formed within the mBTS contained fibromuscular cells (positive staining for smooth muscle actin, myosin, vimentin inter alia) as well as connective tissue. Some foreign body giant cells were seen locally related to the Gore-Tex material as well as few CD-68 positive inflammatory cells.

Conclusion: Histopathological work-up of mBTS revealed complete endothelialisation and only mild inflammatory reactions. A varying degree of tissue proliferation was seen within the lumen of the shunts with a pattern of cells and connective tissue closely resembling intimal proliferation of stented vessel segments. The extent of pseudointima formation was demonstrated to be time dependent.