

Monitoring of immune cell recruitment in murine abdominal aortic disorders by non invasive MRI

ID: 69

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Background:

The pathophysiology of the initiation and development of abdominal aortic aneurysms (AAA) and aortic dissections (AAD) is still unclear. It is known that immune cells such as monocytes and macrophages are of crucial importance in these processes.

Materials and methods:

Here, we performed a magnetic resonance imaging approach based on background-free ¹⁹F MRI and employed perfluorocarbon nanoemulsions (PFCs) for ¹⁹F labeling of monocytes/macrophages to monitor vascular inflammation and AAA/AAD-formation in angiotensin II (angII)-treated apolipoproteinE-deficient (apoE^{-/-}) mice. In parallel, we performed a conventional ¹H MRI for the characterization of aortic flow patterns and morphology. AngII (1000 ng/kg/min) was infused into apoE^{-/-} mice via osmotic minipumps for ten days and mice were monitored by multiparametric ¹H/¹⁹F MRI. PFCs were intravenously injected directly after pump implantation followed by additional applications on days two and four to allow an efficient ¹⁹F loading of circulating monocytes.

Results:

The combination of angiographic, hemodynamic, and anatomical measurements allowed an unequivocal classification of mice in groups with developing AAAs, AADs, or without any obvious aortic vessel alterations despite the exposure to angII. Maximal luminal and external diameters of the aorta were enlarged in AAAs, whereas AADs showed either a slight decrease of the luminal diameter or no alteration. ¹H/¹⁹F MRI after intravenous PFC application demonstrated significantly higher ¹⁹F signals in aortae of mice that developed AAAs or AADs as compared to mice in which no aortic disorders were detected. High-resolution ¹H/¹⁹F MRI of excised aortae revealed a patchy pattern of the ¹⁹F signals predominantly in the adventitia of the aorta. Histological analysis confirmed the presence of macrophages in this area and flow cytometry revealed higher numbers of immune cells in aortae of mice that have developed AAA/AAD. Importantly, there was a linear correlation of the ¹⁹F signal with the total number of infiltrated macrophages.

Conclusion:

In conclusion, our approach enables a precise differentiation between AAA and AAD as well as visualization and quantitative assessment of inflammatory active vascular lesions and therefore may help to unravel the complex interplay between macrophage accumulation, vascular inflammation, and the development and progression of AAAs and AADs.

Quality of life after endovascular and open abdominal aortic aneurysm repair

ID: 311

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Background:

Aim of the present study was to assess the health-related quality of life (HRQoL) of patients after open surgical (OR) or endovascular treatment (EVAR) of infrarenal abdominal aortic aneurysms (AAA). In addition, effect of incisional hernias (IH) after OR on HRQoL was assessed.

Materials and methods:

Patients who underwent OR or EVAR for treatment of AAA between 2008 and 2016 at Rostock University Medical Center were included in a retrospective cohort study. The actual HRQoL was assessed using the SF-36 questionnaire. The incidence of IH was recorded from patient files and telephone contact. After a mean follow-up period of 7.1 years, the SF-36 questionnaire scores of 83 patients (OR: n = 36; EVAR: n = 47) were recorded.

Results:

Comparing HRQoL between OR and EVAR groups, both groups scored higher on one dimension of the questionnaire each. The incidence of IH after OR was 30.6 %. A significant influence of IH on HRQoL was found in three dimensions of the SF-36 questionnaire. Significantly lower scores of patients with an IH were shown in the dimensions of 'physical functioning', 'role physical' and 'role emotional'.

Conclusion:

Based on this retrospective data collection, it can be concluded that the occurrence of IH has a relevant impact on HRQoL of patients with AAA, whereas the choice of aneurysm treatment does not.

Multimodal repair of renal artery aneurysm- 10-years single center experience

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Background:

Renal artery aneurysm (RAA) is a rare disease with various treatment options in indicated patients. In the current survey, the ten-year experience in treatment of RAAs using different endovascular and surgical treatments depending on RAA characteristics is discussed.

Materials and methods:

All patients undergone RAA treatment via endovascular or surgical approaches at our center between January 2010 and December 2020 were enrolled. Patient demographics and peri-operative and late results were collected from a prospectively maintained database.

Results:

Eleven patients with RAA underwent treatment as follows: four patients received endovascular approach, four patients underwent in-situ RAA repair, and kidney autotransplantations were carried out in three patients. In all three treatment groups, the first therapeutic attempt was successful and none of the patients underwent secondary intervention due to RAA. Kidney autotransplantation was associated with a higher blood loss and a longer time of procedure compared to that of endovascular approach and in-situ repair. In-hospital postoperative complications were reported in five patients, including renal pole perfusion defect, renal artery thrombosis, and urinary tract infection. No acute kidney organ loss was seen, but one patient suffered from chronic kidney loss due to renal artery occlusion. In one patient undergoing autotransplantation, ureter anastomosis was reported, which led to acute renal failure, and a surgical treatment with resection and reanastomosis of the ureter was necessary. Hypertension was not resolved after RAA repair in any of the patients with preoperative hypertension.

Conclusion:

RAA treatment selection depends on patient characteristics, anatomy, location, and arising branches of the aneurysm. In cases with complex anatomy, treatment strategy could not be just decided based on consensus guidelines, but a multidisciplinary team is required. Interventional therapies showed excellent results in non-complicated proximal aneurysms, especially regarding the length of hospital stay and postoperative morbidities. Open surgery is a complementary alternative in cases where minimally invasive therapy is not possible. Ex-situ repair with autotransplantation could be considered for anatomically complex distal aneurysms.

Vascular injury during urologic surgery

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Background:

This review provides a summary of the epidemiology and discusses strategies to control bleedings after vascular injury during urologic surgery. Techniques of vascular approaches are discussed as well as tricks for vascular repair mechanisms.

Materials and methods:

We performed a selective literature search based on retrospective and comparative studies as well as on book chapters.

Results:

According to the type of surgery performed different vessels are concerned. Arteries and veins can be affected. Severe bleeding is usually located retroperitoneal affecting the aorta, renovisceral and iliac vessels. Predisposing urologic operations are lymphadenectomy, nephrectomy and (zysto)prostatectomy just as the laparoscopic approach can cause bleeding complications.

Anatomical vessel localization influences the degree of injury. Vascular injuries span from arrosion to avulsion. Thus, the spectrum of therapy is from vascular suture to open or endovascular repair.

Prevention of exsanguination requires visual control to stop the bleeding. The surgeon must act rapid to initiate appropriate repair, to aim for damage control and stabilization of the patient. Planning the surgery and consulting an experienced surgeon are decisive for successful management.

Catastrophic bleeding has to be controlled and in the case of arterial injury it is often necessary to reconstitute perfusion. Reconstructions such as vascular anastomoses, patch angioplasty or interposition grafts are the preferred surgical techniques which are influenced by the nature of the injury.

Preparation of vessels has to be done thoroughly before cross clamping to prevent injury by vascular clamps. Veins can often be ligated. Endovascular repair is also a possibility to control the bleeding; but nowadays it is often a definitive therapy method. For example, resuscitative endovascular balloon occlusion is useful to stabilize the patient and to initiate repair mechanisms.

Conclusion:

Generally, vascular injuries during urologic surgery are rare. But hemorrhage from vascular injury is a common cause of critical morbidity and mortality in the perioperative period. Susceptibility to vascular complications such as oncological debulking and revision surgery increase risk for damage.