Intracranial Aneurysm research

- THSD1 Is a Multifaceted Regulator in Health and Disease
- Elevated Expression of TGFB1 in PBMCs Is Associated with Intracranial Aneurysm Formation, but TGFB3 Expression Implicated Rupture
- Worthwhile or Not? The Pain-Gain Ratio of Screening Routine cMRIs in a Maximum Care University Hospital for Incidental Intracranial Aneurysms Using Artificial Intelligence
- Non-Saccular Aneurysm Shape as a Poor Prognostic Factor in Younger Patients with Spontaneous Subarachnoid Hemorrhage
- Histological Analysis of Intracranial Cerebral Arteries for Elastin Thickness, Wall Thickness, and Vessel Diameters: An Atlas for Computational Modeling and a Proposed Predictive Multivariable Model of Elastin Thickness
- The role of systemic inflammation in the formation and rupture of intracranial aneurysms in moyamoya disease: a retrospective cohort study
- Isochrone-based Identification of Gaps in Neurovascular Care in Germany
- Statin versus no statin after treatment with pipeline embolization device for intracranial aneurysms: a meta-analysis

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Intracranial aneurysm research is a critical area of study focused on understanding the causes, risk factors, diagnosis, treatment, and prevention of aneurysms located within the blood vessels of the brain. Intracranial aneurysms pose a significant medical challenge due to their potential for rupture, leading to life-threatening conditions such as subarachnoid hemorrhage. Research in this field aims to improve our knowledge of intracranial aneurysms and enhance patient outcomes. Here are key aspects of research in this area:

Epidemiology and Risk Factors:

Investigating the epidemiology of intracranial aneurysms involves understanding the prevalence, incidence, and distribution of these aneurysms in different populations. Identifying risk factors, such as genetics, age, sex, smoking, and hypertension, helps in predicting and preventing aneurysm formation. Pathophysiology:

Research delves into the underlying mechanisms leading to the development and progression of intracranial aneurysms. Understanding the molecular, genetic, and biomechanical factors contributing to aneurysm formation is crucial for developing targeted therapies.

Imaging and Diagnosis:

Advances in imaging technologies, such as magnetic resonance angiography (MRA), computed tomography angiography (CTA), and digital subtraction angiography (DSA), contribute to improved diagnostic capabilities. Research focuses on refining imaging techniques and exploring new biomarkers for early detection and monitoring. Genetics and Familial Aneurysms:

Investigating the genetic basis of intracranial aneurysms is essential, especially in cases of familial clustering. Identifying specific genes associated with an increased risk helps in genetic counseling and

understanding the hereditary aspects of aneurysm formation. Natural History and Rupture Risk Prediction:

Studying the natural history of intracranial aneurysms involves tracking their growth, stability, and the likelihood of rupture. Research aims to develop reliable models for predicting rupture risk based on aneurysm characteristics, patient factors, and hemodynamic parameters. Treatment Strategies:

Research explores both surgical and endovascular treatment options for intracranial aneurysms. Comparing the effectiveness, safety, and long-term outcomes of different interventions helps guide clinical decision-making. Endovascular Innovations:

Investigating new endovascular techniques and devices is a dynamic area of research. This includes the development of novel embolization materials, flow diverters, and stent-assisted coiling to improve the safety and efficacy of endovascular treatments. Follow-up and Outcomes:

Long-term studies assess the outcomes and quality of life of patients who have undergone treatment for intracranial aneurysms. Understanding the durability of interventions and potential complications informs ongoing care and rehabilitation strategies. Prevention and Lifestyle Interventions:

Research explores lifestyle modifications and pharmacological interventions that may reduce the risk of intracranial aneurysm formation and progression. This includes studies on the impact of blood pressure control, smoking cessation, and other modifiable factors. Patient-Centered Research:

Focusing on patient experiences, preferences, and outcomes is crucial. Patient-centered research assesses the psychosocial impact of intracranial aneurysms and informs strategies for patient education and shared decision-making. Ongoing advancements in medical research, technology, and collaborative efforts among multidisciplinary teams contribute to the evolving landscape of intracranial aneurysm research. Ultimately, the goal is to enhance our understanding of these complex vascular abnormalities and improve patient outcomes through innovative and evidence-based approaches.

Genetic modification in a mouse model of IAs, including deletion or overexpression of a particular gene, provides an excellent means for examining basic mechanisms behind disease pathophysiology and developing novel pharmacological approaches. All existing animal models need some pharmacological treatments, surgical interventions, or both to develop IAs, which is different from the spontaneous and natural development of aneurysms under the influence of the classical risk factors. The benefit of such animal models is the development of IAs in a limited time. However, clinical translation of the results is often challenging because of the artificial course of IA development and growth. Khan et al. summarized the continuous improvement in mouse models of IAs. Moreover, they discussed the pros and cons of existing mouse models of IAs and highlighted the main translational roadblocks and how to improve them to increase the success of translational Intracranial Aneurysm research [1].

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Khan D, Li X, Hashimoto T, Tanikawa R, Niemela M, Lawton M, Muhammad S. Current Mouse Models of Intracranial Aneurysms: Analysis of Pharmacological Agents Used to Induce Aneurysms and Their Impact on Translational Research. J Am Heart Assoc. 2024 Jan 23:e031811. doi: 10.1161/JAHA.123.031811. Epub ahead of print. PMID: 38258667.