Toho Journal of Medicine Vol. 6 No. 2 掲載論文の紹介

要約：

Ulcerative colitis is a chronic inflammatory disease of the large intestine. The number of patients with ulcerative colitis is rapidly increasing worldwide; it was only around 150 years ago that this disease was recognized medically. This article reviews the history of ulcerative colitis and its treatment, as per previous studies. A suspected case of ulcerative colitis was first described in modern medicine in 1768. The term "ulcerative colitis" first appeared in literature in 1875; it was only recognized as a disease in the early twentieth century. No effective treatment was found at that time, which brought the mortality rate of hospitalized patients with ulcerative colitis to almost 50%. The first case series of ulcerative colitis was reported in Japan in 1928. The development of treatment is as follows: sulfasalazine in the 1940s, corticosteroids in the 1950s, thiopurines in the 1970s, and biologics in the late 1990s. Since 2000, molecular targeted drugs have been developed one after another. I would like to express my sincere respect and appreciation to the pioneers whose tireless efforts and passion had advanced the diagnosis, treatment, and pathophysiological elucidation of ulcerative colitis. We must receive the batons from them and continue the efforts in finding the cure for ulcerative colitis.

    KEYWORDS: ulcerative colitis, history, literature, treatment

要約：

Limited neuronal bodies and dendrites are observed in the white matter, and approximately 60% of the white matter space is occupied by the neuronal fibers. Approximately 70%-95% of the nerve fibers are covered by a myelin sheath. However, sequences of routine clinical magnetic resonance imaging (MRI), such as T2- and T1-weighted imaging and fluid-attenuated inversion-recovery, only provide qualitative, non-specific, tissue contrast images. Therefore, numerous MRI methods have been introduced for *in vivo* myelin and axon quantification. Myelin water fraction is a relatively older MR technique for quantitative MRI of the myelin sheath. Another method for *in vivo* myelin estimation is the use of R1, R2, and proton density values and has shown to be promising in some neurological disorders. Diffusion tensor imaging is a good candidate for quantitative MRI of the axon; however, it has some limitations. Neurite orientation dispersion and density imaging is a model-based diffusion-weighted MRI technique; it yielded good results in clinical settings. Moreover, the MR g-ratio, which is calculated with the myelin volume fraction and axon volume fraction, using myelin- and diffusion-sensitive methods, respectively, showed promising results, providing new insights into *in vivo* microstructural imaging.

    KEYWORDS: magnetic resonance imaging, myelin volume fraction, axon volume fraction, diffusion-weighted imaging, magnetic resonance g-ratio

Evaluation of Morphological Dynamic Changes in the Aortic Annulus and Sinotubular Junction in Candidate Patients for Transcatheter Aortic Valve Implantation Using 4-Dimensional Computed Tomography Voxel Tracking

Sakai K, Iguchi N, Tamura H, Utanohara Y, Isobe M, Ikeda T

要約：

Introduction: In recent years, rather than surgically replacing the aortic valve, transcatheter aortic valve implantation (TAVI) has been performed. This study aimed to evaluate the morphological dynamic changes in the aortic annulus and sinotubular junction (STJ) using 4D-computed tomography (CT) voxel tracking in TAVI candidates.

Methods: We enrolled 75 consecutive patients with aortic stenosis (AS) and 42 controls who underwent cardiac CT. Scans were performed using spiral acquisition with retrospective electrocardiogram-gated image reconstruction. We used motion coherence image processing, which performs deformable registration to track all voxels throughout multiple phases and interpolates images between phases to generate new phases. Using voxel tracking technology, we constructed a time-area curve and time-circumference length curve for the aortic annulus and STJ, respectively. From these curves, we determined the peak and nadir values of the area and circumference length during one cardiac cycle.

Results: There was no significant difference between the AS and control groups regarding the area size, but the circumference length was significantly greater in the AS group than in the controls ($p < 0.001$). The phase with the largest area was significantly slower in the AS group than in the controls ($p = 0.005$). In both groups, the changes in area and circumference length were greater in the aortic annulus than in the STJ ($p < 0.001$).

Conclusions: Dilatability during the cardiac cycle is different between the aortic annulus and the STJ. Additionally, the phase during which the aortic annulus area is maximum occurs later than normal in patients with AS.

KEYWORDS: aortic annulus, STJ, 4D-CT, transcatheter aortic valve implantation (TAVI), voxel tracking

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Influence of Gastric Emptying on the Outcome of the 75-g Oral Glucose Tolerance Test

Suzuki T, Komatsu F, Takemoto I, Kijima S, Sasaki Y, Urita Y

要約：

Introduction: The 75-gram oral glucose tolerance test (75-g OGTT) is a widely used procedure and is considered the gold standard for diagnosing diabetes. Variations in gastric emptying result in the false estimation of the OGTT. The aim of this study was to determine whether altering gastric emptying affects the postprandial insulin and glucose response to 75 g of glucose.

Methods: Eighty-two diabetic patients without medication (42 women and 40 men; age range: 30-84 years; average: 62 years) without any abdominal symptoms were recruited into this study. The ^{13}C-acetate breath test was performed to assess gastric emptying. After an overnight fast, patients received 75 g of anhydrous glucose in 225 mL of water, which contained 100 mg of ^{13}C-acetate. Breath samples were collected at 10-min intervals for 180 min.

Results: There was a positive correlation between serum insulin at 30 min and $^{13}CO_2$ excretion at 30, 60, and 90 min but no relationship between $^{13}CO_2$ excretion and serum insulin at 90 min or later. An inverse correlation was found between serum glucose and $^{13}CO_2$ excretion. The homeostasis model assessment for insulin resistance did not correlate with $^{13}CO_2$ excretion, except at 90 min.

Conclusions: Hyperglycemia at an early phase after an oral glucose load should depend on gastric emptying and that at a late phase should be influenced by glucose metabolism, specifically glucose oxidation. Gastric emptying was a great determinant of not only rapid insulin response but also delayed insulin response.

KEYWORDS: glucose tolerance test, gastric emptying, ^{13}C-acetate breath test, insulin response, insulin resistance

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Characteristics of Exploratory Eye Movements in Individuals with Attenuated Psychotic Syndrome
Shido Y, Nemoto T, Saito J, Matsushima E, Kojima T, Mizuno M
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要約：

Introduction: Patients with schizophrenia experience significant trouble with various symptoms and disabilities. Early detection and intervention are important to prevent such difficulties. We focused our attention on patients' exploratory eye movements (EEMs) as one of the physiological markers for early detection. The aim of this study was to examine the characteristics of the EEMs in patients with attenuated psychotic syndrome (APS).

Methods: We recruited 30 healthy controls, 25 patients with no family history of psychosis who were diagnosed as having APS, and 25 patients with schizophrenia. We performed the EEM test for all the participants, and four parameters were documented: number of eye fixations (NEF), total eye scanning length (TESL), mean eye scanning length (MESL), and responsive search score (RSS).

Results: Of the four parameters, NEF, TESL, and RSS were significantly lower in the APS and schizophrenia groups than in the healthy controls. However, there were no significant differences in these three parameters between the APS and schizophrenia groups. The percentages of patients suspected as having schizophrenia using a discriminant function in the healthy control, APS, and schizophrenia groups were 13%, 56%, and 72%, respectively.

Conclusions: The characteristics of EEMs in APS were similar to those in schizophrenia. Individuals with APS did not have a family history; however, some ultra-high-risk individuals detected only with psychopathology may include risks associated with genetic factors, even though they do not have any obvious psychotic features yet. The EEM test seems useful in detecting individuals with APS and early schizophrenia.

KEYWORDS: attenuated psychotic syndrome, early intervention, exploratory eye movements, psychophysiology, schizophrenia

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Analyses of *N*-Methyl-D-Aspartate Receptor-Related Metabolites in the Serum of Antipsychotic-Naïve Individuals with at-Risk Mental State
Tagata H, Tsujino N, Onozato M, Nemoto T, Fukushima T, Mizuno M
Toho J Med 6（2）: 90—97, 2020

要約：

Introduction: The criteria for "at-risk mental state" have been advocated as a preventive approach to psychosis treatment although their pathophysiological mechanisms remain unclear. Reliable biomarkers to predict transitions from at-risk mental state to psychosis are urgently needed. Since abnormalities in *N*-methyl-D-aspartate receptor co-agonists have been reported in the serum of patients with schizophrenia, several of these metabolite levels in individuals with at-risk mental state were investigated and these levels with clinical symptoms were correlated.

Methods: Serum levels of glutamate, cysteine, glycine, γ-glutamylcysteine, glutathione, D-serine, and L-serine were investigated in antipsychotic-naïve individuals with attenuated psychotic symptoms (n = 28) and compared with those in antipsychotic-naïve individuals with first-episode psychosis (n = 13) and those in healthy controls (n = 41). The serum metabolite levels were measured using high-performance liquid chromatography with fluorescence detection or liquid chromatography with tandem mass spectrometry. Correlations between clinical symptoms and serum metabolite levels in individuals with at-risk mental state were also examined.

Results: The glutathione and D-serine levels were significantly lower, whereas glutamate levels were significantly higher in individuals with attenuated psychotic symptoms than in healthy controls. Additionally, glutathione levels were significantly decreased in individuals with first-episode psychosis compared with those in healthy controls. In individuals with attenuated psychotic symptoms, clinical scores were not correlated with serum levels of metabolites related to the *N*-methyl-D-aspartate receptor.

Conclusions: The results of this study suggest that abnormally altered levels of metabolites related to the *N*-methyl-D-aspartate receptor can already occur in individuals with attenuated psychotic symptoms.

KEYWORDS: *N*-methyl-D-aspartate receptor, at-risk mental state, attenuated psychotic symptom, schizophrenia, serum biomarker