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Urinary charged metabolite profiling of colorectal polyps using capillary electrophoresis-mass spectrometry

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Colorectal cancer (CRC) has increasing global prevalence and poor prognostic outcome. The adenoma-carcinoma sequence theory in CRC is well-known and serves as a model for oncogenes and suppressor genes. In most cases, if it is found at the colorectal polyp (P), it can be cured by endoscopic resection. Therefore, early detection and treatment at P stage, which is a precancerous condition, is very important in preventing CRC. However, until now, there have only been a few studies on P because it is classified as a benign disease.

In addition, it is desirable that the consultation rate is high for early detection of CRC and P. In order to increase the screening test rate, it is necessary to develop a simpler screening test method with high sensitivity and specificity for CRC and P. Urine samples can be collected non-invasively and are excellent biomarkers containing various metabolites. By identifying metabolites with high sensitivity and specificity to CRC and P, it may become a screening test to replace the fecal occult blood test in the future.

To understand the metabolomic profiles of CRC or P and healthy controls (HC), we conducted metabolomic profiling of urinary samples. Capillary electrophoresis-mass spectrometry (CE-MS) was used to quantify hydrophilic metabolites in subjects with CRC or P, and HC. The identified and quantified metabolites included metabolites of glycolysis, TCA cycle, amino acids, urea cycle, and polyamine pathways. In particular, it contained many metabolites predominantly P and CRC in the histidine cycle compared to HC.

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Relationship between thoracic alignment in standing posture and internal ankle moment of frontal plane during gait

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【Purpose】 The internal ankle moment of frontal plane (IAMF) is the activity of the varus and valgus muscles of the ankle joint and contributes to lateral stability of gait. We assume that the IAMF is associated with thoracic alignment, which includes the center of mass of the upper body, because the IAMF is affected by the position of the center of gravity. In this study, we investigated the effect of thoracic alignment on the IAMF during gait.

【Methods】 Twenty-two healthy adult males were subjected to the following measurements using a 3D motion analyzer and force plates. The lateral thoracic deviation and the asymmetrical ratio (R/L) of the upper and lower thoracic shapes were measured in the standing position. The thoracic shape was calculated as the anteroposterior diameter of the thorax. The peak values of the valgus moment and varus moment of the ankle joint during the left and right stance phase were measured during the natural gait. For statistical processing, a 95% confidence interval was calculated from the thoracic data, and the IAMF was compared left and right. The asymmetry (R-L) of the IAMF was calculated, and the