Early detection of major surgical postoperative complications evaluated by microdialysis

av

Tal M. Hörer

Akademisk avhandling

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Opponent: Prof. Bengt Jeppsson Lunds Universitet

Örebro universitet Institutionen för hälsovetenskap och medicin 701 82 ÖREBRO
Abstract

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Major abdominal surgery may be followed by postoperative complications, especially in the elderly and patients with co-morbidities as diabetes mellitus and obesity. Some of the most feared complications as anastomotic leakage, abdominal infections, abdominal compartment syndrome (ACS) and intestinal ischemia can lead to sepsis, systemic inflammatory response syndrome (SIRS) and multiple organ dysfunction syndrome (MODS) with high morbidity and mortality. This thesis evaluates intraperitoneal microdialysis (IPM) as a method for early detection of surgical complications. IPM measures extracellular metabolites as lactate, pyruvate, glycerol and glucose. The lactate/pyruvate (l/p) ratio describes the current relationship between aerobic and anaerobic metabolism. Glycerol is a degradation product of lipolysis from fat and a part of the cell membrane and released when cell injury occurs. In Paper I, evaluation of IPM in patients with and without diabetes mellitus and obesity during 48 hours after abdominal surgery did not show any difference in l/p ratio and glycerol levels compared to a control group. Paper II investigated the first two days after abdominal surgery in patients with major complications using IPM. L/p ratio was higher and glycerol was lower. Paper III used IPM in the immediate postoperative period in patients after endovascular repair for ruptured abdominal aortic aneurysm (rEVAR). Patients who required decompression due to intra-abdominal hypertension (IAH) with organ failure had higher l/p ratio and glycerol. Paper IV investigated the effects of Aortic Balloon Occlusion (ABO) and Superior Mesenteric Artery (SMA) occlusion for one hour followed by three hours reperfusion in an animal model. ABO had a pronounced effect on the hemodynamic state. L/p l/p ratio increased during ischemia and decreased on reperfusion while glycerol increased on reperfusion and the effect was less pronounced in the SMA group. In conclusion, IPM monitoring of l/p ratio and glycerol indicates serious postoperative complications at an early stage. The l/p ratio increases or is continuously high while glycerol seems to have a more complex pattern. Diabetes and obesity do not influence the results.

Keywords: Aortic occlusion balloon, Anastomotic leakage, Glycerol, Intraperitoneal microdialysis, Intestinal ischemia, Intraperitoneal metabolism, Lactate/pyruvate ratio, Postoperative complications, Ruptured abdominal aortic aneurysm.