The Association Between Beta-Blockade and Clinical Outcomes in the Context of Surgical and Traumatic Stress

av

Aline Rebecka Irene Ahl

Akademisk avhandling

Avhandling för medicine doktorsexamen i medicinsk vetenskap med inriktning mot kirurgi, som kommer att försvaras offentligt onsdagen den 5 juni 2019 kl. 10.00, Hörsal C2, Campus USÖ

Opponent: Prof. Jonathan Tilsed
Consultant Colorectal Surgeon at Hull & East Yorkshire Hospitals
Honorary Senior Lecturer Hull York Medical School
Chairman UEMS Division of Emergency Surgery
Vice Pres. European Society for Trauma and Emergency Surgery

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Abstract

Traumatic injury and major abdominal surgery are areas in general surgery associated with high rates of morbidity and mortality. The overall colorectal cancer surgery mortality rate is around 4%, with that for emergency surgery more than twice as high as for planned. Surgical morbidity varies between 25% and 45%. Around half of trauma patients develop low mood. In one quarter of patients this becomes permanent. Depression is known to impede physical rehabilitation and recovery. The onset of physiological stress, driven by adrenergic hyperactivity following traumatic and surgical injury is hypothesized to contribute to these adverse outcomes. Interest has therefore been sparked into blocking adrenergic receptor activation.

Papers I and II investigated the role of beta-blocker therapy in preventing post-traumatic depression following severe traumatic brain injury (Paper I) and severe extracranial injury (Paper II). The Karolinska University Hospital Trauma Registry was used to identify patients admitted between 2007 and 2011. In Paper I (n = 545), patients on pre-injury beta-blocker therapy were matched to beta-blocker naïve patients with equivalent injury burden. Results revealed that beta-blocked patients exhibited a 60% reduced risk of needing antidepressant therapy within one year of trauma. In Paper II (n = 596), the lack of beta-blocker use before extracranial trauma was linked to a three-fold increase in the risk of antidepressant initiation.

Papers III-V explored the role of pre-operative beta-blocker therapy in patients undergoing surgery for colorectal cancer between 2007 and 2016, identified using the nationwide Swedish Colorectal Cancer Registry. Paper III (n = 3,187) identified a 69% reduction in the risk of 30-day mortality in beta-blocked patients. Paper IV (n = 22,337) outlined long-term survival benefits for patients on beta-blocker therapy prior to undergoing elective surgery for colon cancer. Beta-blocked patients showed a risk reduction of 42% for 1-year all-cause mortality and 18% for 5-year cancer-specific mortality. Similarly, patients on beta-blocker therapy who underwent surgery for rectal cancer demonstrated improved survival up to one year after surgery with a risk reduction of 57% and a reduction in anastomotic failure and infectious complications in Paper V (n = 11,966).

Keywords: Beta-blocker therapy, adrenergic hyperactivity, physiological stress, trauma, depression, colorectal cancer, complications, mortality.

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Abstract

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