SECTION 19.
MEDICAL SCIENCES AND PUBLIC HEALTH

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THE ROLE OF OBESITY IN THE DEVELOPMENT OF EARLY POSTOPERATIVE PAIN AFTER ARTHROSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

Injury to the anterior cruciate ligament (ACL) is among the most common intra-articular knee injuries, most frequently occurring in young, physically active individuals and often resulting in prolonged functional limitations. The clinical significance of this condition is determined not only by its high incidence, but also by the risk of chronic knee instability, recurrent injury, and secondary damage to the menisci and articular cartilage, all of which may adversely affect patients' quality of life and necessitate prolonged recovery [1–3].

According to current evidence, the likelihood of ACL injury is influenced by a number of factors, most notably age, sex, level of physical activity, and the nature of mechanical loading. The higher incidence of ACL rupture in women has been attributed to differences in anatomy, movement biomechanics, neuromuscular control, and the potential influence of hormonal mechanisms [4–6]. Of particular interest is excess body weight, which is regarded as a factor that may worsen both the course of the injury itself and postoperative recovery [7].

The relevance of this issue is further heightened by the growing prevalence of obesity and the increasing incidence of sports-related and everyday knee injuries. Excess body weight is one of the modifiable risk factors that may affect treatment outcomes in patients with ACL injury [8, 9]. From a biomechanical perspective, this may be explained by the fact that during walking and routine daily activities, the

knee joint is exposed to forces exceeding body weight; therefore, in the presence of obesity, mechanical overload of the joint structures predictably increases. This creates conditions both for primary injury to the ligamentous apparatus and for a less favorable postoperative course [8, 10].

From a practical standpoint, early postoperative pain after arthroscopic ACL reconstruction is of particular interest, since its severity may influence the pace of recovery, tolerance to rehabilitation, and the overall effectiveness of treatment. In this context, assessing the role of obesity in the development of pain in the early postoperative period is clinically important for risk stratification and optimization of patient management.

The study employed a prospective single-center comparative design. Pain intensity was assessed using the visual analog scale (VAS) in patients with isolated ACL injury and obesity, defined as a body mass index of ≥30 kg/m². The use of the VAS made it possible to quantitatively characterize pain severity in the early postoperative period.

During 2022–2024, 90 patients aged 19–67 years with isolated ACL injury of the knee joint were examined in the trauma department of the Municipal Non-Profit Enterprise of the Kharkiv Regional Council "Regional Clinical Hospital." Depending on the presence of obesity, the patients were divided into two clinical groups: 38 patients were assigned to the main group and 52 to the control group. Comparative analysis was performed with consideration of medical history as well as clinical and laboratory characteristics.

To identify factors associated with pain severity 1 month after arthroscopic reconstruction, univariate and multivariate regression analyses were performed using medical history and clinical/laboratory characteristics. Based on the obtained regression coefficients, the corresponding predictive models were constructed.

One month after arthroscopic ACL reconstruction, obesity remained a consistent independent predictor of greater pain severity according to the VAS across all models constructed (β=0.382–0.426; p=0.002–0.009). Preoperative VAS pain score also remained a statistically significant predictor (β=0.218–0.255; p=0.006–0.021). In the final multivariate model (R^2=0.376), pain intensity was additionally associated with male sex (β=-0.258; p=0.035), planned hospitalization (β=0.272; p=0.049), length of hospital stay (β=0.043; p=0.021), and preoperative leukocyte count (β=-0.066; p=0.041).

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