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COMPLICATIONS OF SURGICAL TREATMENT FOR DISTAL BICEPS TENDON RUPTURES: CURRENT CHALLENGES AND SOLUTIONS

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Abstract. The paper deals with the current problems and complications of surgical treatment of ruptures of the distal biceps brachii tendon (DBT). The main complications, such as neuropathy, heterotopic ossification, repeated tears, compartment syndrome and “hanging hand” syndrome, are highlighted. Their causes, frequency of occurrence and possible methods of prevention are analyzed. Particular attention is paid to the improvement of fixation techniques, the use of regenerative technologies and the introduction of minimally invasive techniques. Solutions are proposed, including optimization of surgical interventions, standardization of rehabilitation programs and the use of innovative materials. The need for further research to reduce the incidence of complications and improve functional outcomes is emphasized.

Key words: biceps brachii muscle; tendon injuries; conservative treatment; surgical treatment; tendon refixation; biceps tendon.

Relevance of the Issue:

Distal biceps tendon rupture (DBTR) significantly impacts the elbow joint's function and patients' quality of life [1, 2]. Surgical intervention has become the standard for young patients and individuals with high functional demands. The challenges associated with complications such as neuropathies, heterotopic ossification (HO), recurrent ruptures, and the lack of standardized rehabilitation

protocols require further research and improvements in treatment methods [1].

Common Complications:

Neuropathies (lateral antebrachial cutaneous nerve, posterior interosseous nerve): Their incidence ranges from 2% to 9.2%, with higher frequency observed in single-incision techniques [1, 3]. The main causes include nerve trauma during surgery. Most symptoms resolve spontaneously, but some cases require additional interventions [3].

"Dropped wrist" syndrome: Posterior interosseous nerve injury can cause significant functional impairments. Most cases resolve spontaneously, but severe cases may require physiotherapy or surgical decompression [11].

Heterotopic ossification (HO): Occurs in up to 3.9% of cases, caused by tissue trauma, bone fragments, and hematoma formation at the refixation site [1]. HO can limit elbow joint mobility and may require additional treatment [4, 9].

Recurrent ruptures: Most frequently associated with anchors or interference screws. Cortical button fixation demonstrates superior fixation strength and lower recurrence rates [1, 8].

Compartment syndrome: A rare complication requiring urgent intervention. Prevention involves monitoring tissue pressure, especially in patients with significant swelling [1, 10].

Potential Solutions:

Adoption of minimally invasive techniques to reduce intraoperative trauma [7].

Optimization of fixation methods, including cortical button fixators with adaptive loops [1, 8].

HO prevention through meticulous hemostasis, operative field irrigation, tourniquet use, and minimizing residual bone fragments [1, 9].

Exploration of regenerative technologies, such as stromal vascular fraction (SVF) or mesenchymal stem cells, to stimulate tendon integration and reduce rehabilitation periods [5, 6, 12].

Enhancement of rehabilitation programs tailored to fixation techniques, including advanced technologies such as electrical stimulation or virtual reality

[1, 13].

Issues requiring further analysis and research:

Long-term results. Study of data on long-term results of different fixation techniques, in particular 5-10 years after surgery. Include information on preservation of joint functionality, chronic pain, and recurrence [8, 14].

Conclusions:

Current trends in the surgical treatment of ACL tears demonstrate progress in improving fixation techniques, but the incidence of complications remains significant. Further research should focus on:

- reducing intraoperative trauma,

- standardization of rehabilitation programs,

- studying the latest regenerative technologies.

This will improve treatment outcomes and reduce the number of repeat surgeries.

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