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Comment on the Article "The Effect of Pharmacological Thromboprophylaxis, Tourniquet and Drainage on Hemorrhagic Complications in the Early Stage after Knee Arthroplasty: Preliminary Results"

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Hemorrhage and venous thromboembolism occurring after large orthopaedic surgeries including total knee joint arthroplasty (TKA) are disastrous complications that can be life-threatening for patients [1]. Without thromboprophylaxis the rate of venous thromboembolic complications (VTCs) after TKA according to some authors [1] can reach 40-80% as observed during additional specific examination of all patients. The most threatening type of such complication is pulmonary embolism (PE) in which the risk of lethal outcome for patients undergoing knee joint replacement amounts from 0.1 to 2.0% and is of the main reasons for perioperative mortality. Non-fatal PE is observed even more often — in 1.8-7.0% of cases [2, 3]. Prophylactic application of anticoagulants in the majority of patients after hip or knee arthroplasty today is a treatment standard [4] according to Russian clinical recommendations for prophylaxis of venous thromboembolic complications in traumatology and orthopaedics.

Although minimization of VTCs rate remains today a key clinical task after orthopaedic surgeries, the use of various options of such therapy is a subject of active discussions caused first of all by an increasing number of hemorrhagic complications [1, 5, 6]. Hemorrhage risk is the major concern of orthopaedic surgeons who prescribe anticoagulating medications. However, we should mention that the same surgeons quite clearly understand the risk of VTC occurrence including the lethal outcomes in case they refuse pharmacoprophylaxis.

The paper of A.R. Kasimova et al is exactly dedicated to the issues of optimization of thromboprophylaxis strategy to reduce the risk of hemorrhagic complications where the authors evaluate the effect of the most popular medications for VTC prophylaxis today: rivaroxaban, dabigatran etexilate and acetylsalicylic acid.

Appearance in our arsenal of convenient and effective direct oral anticoagulants not requiring routine laboratory control definitely attracts huge interest to such medication, especially considering the current trend for early discharge from hospital for outpatient treatment [1]. It should be emphasized that

• *Comment on the Article*

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recommendations based on evidence medicine indicate the need for anticoagulants administering for 4-35 days postoperatively [7, 8] after knee and hip joint replacement.

At the same time the well-known acetylsalicylic acid preparations (aspirin) are inexpensive, universal and widely available antiplatelet agents. Such preparations have proven their efficiency for prophylaxis of venous embolism in postoperative period according to clinical trials and results of meta-analyses, but still the quantity of direct comparative studies with anticoagulants is not sufficient [6, 7, 8].

Back in 2013 a group of researchers from 15 university clinics in Canada published the results of a comparative randomized study evaluating the effectiveness and safety of outpatient application of low molecular weight heparin (dalteparin) and aspirin for prophylaxis of VTC (where all 778 patients received dalteparin during first 10 days after the surgery). Variances between VTC and hemorrhage rates, separately, were not statistically significant. However, when adding up these events the total risk of complications was several times higher in group of patients who received dalteparin (95% CI -0.3; 3.8%; $p = 0.091$) [9]. Later on in the study dedicated to comparison of effectiveness of rivaroxaban and aspirin after knee and hip arthroplasty the same authors analyzed treatment outcomes of 3424 patients. According to study protocol all patients received rivaroxaban 10 mg once per day during 5 days postoperatively, and during second stage after randomization either continued receiving rivaroxaban in the same dose or switched to daily aspirin administration of 81 mg. With that the patients after TKA received preparation of second stage only for 9 days while patients after THA continued supplementary prophylaxis for 30 days. Researchers did not find significant difference in VTC and hemorrhage occurrence between two groups: VTC rate in rivaroxaban group was insignificantly higher (0.70% vs 0.64%) but the hemorrhage rate was higher in aspirin group (large hemorrhage — 0.29% in rivaroxaban group against 0.47% in aspirin group; clinically significant hemorrhage 0.99% against 1.29%, respectively) [7]. Highly interesting are the comments of orthopaedic surgeons to this publication where they emphasize the need to continue such research with assessment of cost efficiency for aspirin administration as VTC prophylaxis.

No less interesting are the latest published data on the use of mechanical VTC prophylaxis. So, D. Arsoy et at in their study published in 2018 compared results of low molecular weight heparins application in combination with static compression and use of aspirin with intermittent pneumocompression [10]. According to obtained data the hemorrhage rate and secondary hospital treatment due to hemorrhagic and infectious complications in patients after TKA was higher in the group where patients received low molecular weight heparins and static compression, while there were no significant variances in origin of VTC in both groups.

H.Y. Yhim et al obtained interesting results after analyzing the Korean national medical data base for the period from 2009 to 2013. The authors analyzed 306 912 cases of knee and hip joint replacement. Pharmaprophylaxis rate was only 57.16% where the most used preparations were low molecular weight heparins and rivaroxaban. The aim of this analysis was to evaluate the effect of thrombosis pharomoprophylaxis on TVC rate during three months after arthroplasty. Surprising results were obtained: VTC rate was higher in patients receiving any pharmacoprophylaxis (including aspirin, low molecular weight heparins, direct peroral anticoagulants) in comparison to those patients who did not receive any agents. However, a more detailed examination demonstrated that VTC rate in rivaroxaban group of patients was minimal which authors explain by extended thromboprophylaxis during outpatient treatment stage in contrast to other medication [11].

Results of the study by A.R. Kasimova et al on effect of tourniquet application during TKA did not provide answer about the advantages of a particular surgical option which corresponds to the results of known meta-analysis performed by I. Alcelik et al in 2012 [12] also mentioned in the paper.

The statement on the reasonability to refuse routine draining of postoperative wound was confirmed by the results of conducted research as well as by mentioned literature data.

Thus, though the performed single center research doesn't provide a sufficient sample size to prove the advantages of a particular VTC prophylaxis method, is yet the first randomized study in Russia comparing two most popular peroral anticoagulants used after TKA with acetylsalicylic acid. A similar profile of effectiveness and safety of all three preparations was obtained in patients without additional risk factors for venous thrombosis. Further research to obtain more convincing data in the framework of multicenter randomized studies is undoubtedly needed. However, the obtained results in combination with relative low cost and availability of acetylsalicylic acid should be taken into account by professional traumatology and orthopaedic society for revision of recommendations for prophylaxis of thromboembolic complications in patients without additional risk factors who will undergo planned arthroplasty of large joints.

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