Intracerebral hemorrhage formation under oral anticoagulation: clinical and translational evidence

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Direct oral anticoagulants (DOAC) are replacing vitamin K antagonists (VKA) as standard prophylaxis for stroke and systemic embolism in patients with non-valvular atrial fibrillation. The randomized trials that led to the approval of apixaban, dabigatran, edoxaban, and rivaroxaban demonstrated at least equivalent effectiveness regarding the prevention of embolic events and a significant reduction of intracranial hemorrhagic complications, including ICH. Post approval analyses from large registries confirmed the findings of the pivotal studies. In parallel with the broad application of these drugs in clinical routine, new questions have arisen. For example, it remains unclear whether DOAC-associated ICH show lower hematoma expansion rates and bleeding volumes compared to ICH occurring under VKA anticoagulation. Such questions are typically difficult to answer in clinical studies, either due to impracticable sample sizes or critical imbalances in baseline parameters. Indeed, highly controversial findings have been published in this context so far. On the other side, there is an urgent need to get insights into the pathophysiology of hematoma expansion under different anticoagulation regimes, in order to ensure an evidence-based application of reversal agents. Here, translational studies may help to fill this gap of knowledge. This presentation summarizes both clinical and experimental data, in order to increase the understanding of hematoma development under different anticoagulation regimes.