Direct Oral Anticoagulant

Oral anticoagulant was first established in 1941 by Karl Paul Link, who discovered dicumarol [1].

DOACs were associated with better efficacy and safety profiles than warfarin in atrial fibrillation patients with prior stroke, more specifically a lower risk of systemic embolism, all-cause mortality, and intracranial hemorrhage (ICH) [2].

Novel oral anticoagulants

Novel oral anticoagulants.

Vitamin K oral anticoagulant

see Vitamin K oral anticoagulant.

Non vitamin K oral anticoagulant

see Non vitamin K oral anticoagulant.

Complications

Oral anticoagulant complications

Oral vitamin K antagonists (VKAs) were the choice of anticoagulant for the long-term treatment and prevention of arterial and venous thromboembolic events (VTE). VKA treatment is safe and effective if a high time in the therapeutic range is achieved. However, achieving a stable, therapeutic

international normalized ratio can prove challenging in the context of drug and food interactions and liver disease, resulting in either an increased risk of thromboembolism due to undertreatment or bleeding due to overtreatment. In recent years, four direct oral anticoagulants (DOACs), dabigatran, rivaroxaban, apixaban and edoxaban, have been compared with warfarin for stroke prevention in atrial fibrillation (AF), in large, phase 3, randomized controlled trials (RCTs).

Various terms have been used to describe these drugs, including new/ novel oral anticoagulants or non-vitamin K oral anticoagulants. The International Society on Thrombosis and Haemostasis recommends using the term 'DOAC' (Direct Oral Anticoagulant) [3)]

Direct Oral Anticoagulant in Neurosurgery

- Collaboration on the optimal timing of anticoagulation after ischaemic stroke and atrial fibrillation: a systematic review and prospective individual participant data meta-analysis of randomised controlled trials (CATALYST)
- Triple-Cue-Guided Multichannel Hydrogel Conduit to Synergistically Enhance Peripheral Nerve Repair
- Hemorrhagic Stroke in Atrial Fibrillation: Trends in Incidence, Case Fatality, and Prior Oral Anticoagulation
- Endovascular Thrombectomy in a Young Female Patient With Atrial Septal Defect: A Case Report
- Risk-factors and multimorbidity in oral anticoagulant-related intracerebral haemorrhage: a comparison of patients in pivotal trials and real life
- In reply: letter to the editor about "Direct oral anticoagulants in embolic stroke of undetermined source: an updated meta-analysis"
- Initiation of direct oral anticoagulation after reperfusion therapy in ischemic stroke in clinical practice: Results from Sits-International Stroke Registry
- Perioperative management of direct oral anticoagulants in patients having a high-bleed-risk surgery or neuraxial procedure: the Perioperative Anticoagulant Use for Surgery Evaluation (PAUSE)-2 pilot randomized trial

Reversal

Direct Oral Anticoagulant Reversal Agents

Perioperative management

There is little evidence to guide the perioperative management of patients on a direct oral anticoagulant (DOAC) in the absence of a last known dose. Quantitative serum titers may be ordered. A preoperative DOAC assay order was associated with worse outcomes despite increased reversal administration. However, the DOAC assay titer can reflect the patient's likelihood of bleeding [4)].

Case series

A study aimed to assess the outcomes of patients with traumatic intracranial hemorrhage taking DOACs compared with those taking warfarin.

A retrospective analysis of patients with traumatic ICH over a 5-year period was conducted. Demographics, injury severity, medication, and outcome data were collected for each patient. Patients taking warfarin and DOACs were compared.

736 patients had traumatic ICH over the study period, 75 of which were on either DOACs (25 patients) or warfarin (50 patients). The median age of the anticoagulated patients was 78 years; 52% were female, and 91% presented secondary to a fall. DOACs were reversed at close to half the rate of warfarin (40% vs 77%; P = .032). Despite this, the 2 groups had similar rates of worsening examination, need for operative intervention, and in-Hospital mortality. In the follow-up, fewer patients taking DOACs had died at 6-months postinjury compared with those taking warfarin (8% vs 30%; P = .041).

Despite DOACs being reversed at nearly half the rate of warfarin, patients presenting with traumatic ICH on warfarin had higher 6-month mortality suggesting a potential survival advantage for DOACs over warfarin in this population [5].

2018

Beynon et al. analyzed the medical records of consecutive patients treated at our institution for acute SDH during anticoagulation therapy with Direct oral anticoagulants (DOAC) or vitamin K antagonists (VKA) during a period of 30 months. Patient characteristics such as results of imaging and laboratory studies, treatment modalities and short-term patient outcomes were included.

A total of 128 patients with preadmission DOAC (n = 65) or VKA (n = 63) intake were compared. The overall 30-day mortality rate of this patient cohort was 27%, and it did not differ between patients with DOAC or VKA intake (26% vs. 27%; p = 1.000). Similarly, the rates of neurosurgical intervention (65%) and intracranial re-hemorrhage (18%) were comparable. Prothrombin complex concentrates were administered more frequently in patients with VKA intake than in patients with DOAC intake (90% vs. 58%; p < 0.0001). DOAC treatment in patients with acute SDH did not increase in-hospital and 30-day mortality rates compared to VKA treatment.

These findings support the favorable safety profile of DOAC in patients, even in the setting of intracranial hemorrhage. However, the availability of specific antidotes to DOAC may further improve the management of these patients [6].

References

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