Anticoagulants and Antiplatelet Agents for Cervical Medial Branch Radiofrequency Neurotomy

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Myth: Therapeutic anticoagulation (AC) and antiplatelet (APT) agents should be discontinued prior to cervical medial branch radiofrequency neurotomy (CMBRFN) due to serious hemorrhagic risks.

Fact: No clinically significant hemorrhagic complication has been reported in the medical literature in association with a CMBRFN procedure. Studies comparing serious risks of continuing versus discontinuing AC and APT agents for CMBRFN procedures are underpowered, but suggest that discontinuation, specifically of warfarin, may carry greater risk of permanent neurologic compromise. The decision to withhold antiplatelet therapy prior to a CMBRFN procedure should be made on a case-by-case basis, weighing the relative risks of hemorrhage versus the risk of thrombosis for each patient.

Cervical medial branch radiofrequency neurotomy (CMBRFN) is a procedure used to treat cervical zygapophysial joint pain. Studies demonstrate an excellent safety profile of CMBRFN when performed according to clinical practice guidelines [1,2,3]. During proper technique a needle or cannula and electrode are advanced along the path of the targeted medial branch to the “target zone” adjacent to the cervical articular pillar. The electrode remains outside of the spinal canal and the neuroforamen, and dorsal to the vertebral artery.

In the case of rare anatomic variants in which the vertebral artery traverses the cervical lateral pillar, CMBRFN should not be performed at the relevant level(s) [4]. Cases of periforaminal arteries have also been documented that could lead to vascular complications [5]. However, in most circumstances, bleeding complications would be expected to be limited to cervical paraspinal hematoma and bleeding at the needle puncture site.

Previous guidelines classified spinal medial branch RFN as carrying an “intermediate risk” of bleeding complications regardless of segmental level [6]. A subsequent update re-classified thoracic and lumbar medial branch RFN as “low risk” for bleeding complications but maintained CMBRFN as “intermediate risk” [7]. The guideline authors acknowledged that these recommendations represented expert consensus “based on limited clinical and animal data.” Alternatively, recent studies have investigated the risk of serious neurologic complications while stopping AC and APT medications compared to serious hemorrhagic risks during interventional spine procedures, thus aiding evidence-based clinical decision making [8-11].

No clinically significant hemorrhagic complications have been documented in the literature associated with CMBRFN when performed with the appropriate technique [12], even when performed for patients who continue AC and APT medications [2,8-11,13-15]. Studies by Endres et al. evaluated the risks of continuing or discontinuing AC and APT medications during common interventional pain procedures [8,9]. During cervical CMBRFN, AC medications were continued for patients who could not be discontinued from their medications, or when their coagulation status was normal. Although the total number of patients undergoing CMBRFN studied was small (n=168), no hemorrhagic events were noted among the 10 patients that continued AC (95% CI: 0.0% to 28%) [9].

Additional studies have shown similar results with zero prevalence of hemorrhagic complications, although the number of patients undergoing CMBRFN were small in patients who remained on AC/APT agents [Goodman et al. (n=3) and Ehsanian et al. (n=7)] [11,15]. Bernstein et al. performed CMBRFN on 40 patients from September 2009 through June 2017 [14]. Of those, 15 patients ceased AC/APT medications while the remaining 25 patients continued AC/APT. There were no hemorrhagic complications, regardless of whether patients continued
or discontinued AC/APT medications (95% CI: 0.0% to 8.8%). Larger studies are needed to establish a more accurate incidence rate of serious hemorrhagic complications when AC/APT agents are continued during CMBRFN.

Conversely, patients who cease AC medications for the duration required to complete an interventional pain procedure demonstrate measurable risk of morbidity or mortal thromboembolic events [9,14,16]. Endres et al. observed nine serious thromboembolic events in association with 2672 procedures for which AC was discontinued [9]. Among the complications suffered were two deaths (fatal stroke, fatal myocardial infarction), one myocardial infarction, five strokes, and one pulmonary embolism. Of note, these complications only occurred in patients who ceased warfarin; however, warfarin was the most prevalent AC, composing 1646 of the 2672 AC that were discontinued. The prevalence of cardiovascular and cerebrovascular complications in patients who ceased warfarin was found to be 0.48% (95% CI: 0.2% to 0.9%). Bernstein et al. found a similar rate of 0.2% (95% CI 0.1% to 0.4%) in those that ceased AC [14].

Risk of thrombotic complications due to withholding APT prior to spinal interventions has yet to be established. Clinical decisions regarding the cessation of APT agents needs to be balanced with the risk of serious cerebrovascular and cardiovascular hemorrhagic complications. A recent Cochrane Review concluded that continuation or discontinuation of APT prior to non-cardiac surgery had little or no effect on adverse ischemic events or blood loss [17]. However, an absolute effect of 17 fewer participants per 1,000 with an ischemic event in the continuation group was noted.

In summary, while there is no clear evidence that CMBRFN is associated with serious hemorrhagic risk when performed according to the clinical practice guidelines [12], the current literature consistently demonstrates a significant and consistent risk ranging from 0.2-0.9% incidence of serious thromboembolic events when AC, specifically warfarin, is discontinued for interventional pain procedures.

**Recommendations**

1. Axial cross-sectional imaging, via either MRI or CT angiogram, should be reviewed prior to CMBRFN in order to ensure the absence of rare arterial anatomic variants, such as a vertebral artery that traverses the cervical lateral pillar. If this variant is present, CMBRFN should not be performed at the relevant level(s).

2. Although larger studies are needed to provide a confident estimate of zero risk of continuing AC or APT prior to CMBRFN, there is currently no evidence that continuing AC or APT prior to this procedure carries risk of clinically significant hemorrhagic complications when performed according to the Spine Intervention Society guidelines.

3. The rate of serious cardiovascular or cerebrovascular complications associated with stopping AC, specifically warfarin, for interventional spine procedures has been found to be approximately 0.5%. It should be noted that complications were only found with warfarin while also noting that warfarin was the most commonly used AC.

4. The decision to stop or continue AC or APT should be made through a shared decision-making process with the patient, the spine interventionalist, and the prescribing provider to account for the relative risks of serious thromboembolic versus hemorrhagic complications.

5. The interventional physician should always consider that not performing a procedure is a relevant option when weighing the risks of thromboembolic and hemorrhagic complications in each individual patient.
References