

Perioperative Management of Anticoagulant Therapy during Cutaneous Surgery: 2005 Survey of Mohs Surgeons

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BACKGROUND The perioperative management of anticoagulation and antiplatelet therapy is a controversial topic in the field of dermatologic surgery. Dermasurgeons must weigh the risk of bleeding against the risk of thrombotic complications when deciding how to manage perioperative anticoagulation.

OBJECTIVE Our aim is to present a summary of current practice in anticoagulation management perioperatively during cutaneous surgery. We compare our results to those found in a similar survey in 2002.

METHODS AND MATERIALS A questionnaire surveying current practice in perioperative management of anticoagulant therapy was mailed to 720 dermasurgeons.

RESULTS Thirty-eight percent of dermasurgeons responded to the questionnaire. Of the responding physicians, 87% discontinue prophylactic aspirin therapy, 37% discontinue medically necessary aspirin, 44% discontinue warfarin, 77% discontinue nonsteroidal anti-inflammatory drugs (NSAIDs), and 77% discontinue vitamin E therapy perioperatively at least some of the time. Although clopidogrel was not surveyed, 78 physicians included comments about the management of this agent.

CONCLUSION Dermasurgeons were more likely to continue medically necessary aspirin and warfarin in 2005 compared to 2002, with the most dramatic shift evident in the management of warfarin. They were more likely to discontinue prophylactic aspirin, NSAIDs, and vitamin E. Surgeons were concerned about bleeding with the antiplatelet agent clopidogrel. More evidence-based medicine is necessary to set guidelines for the management of anticoagulation and antiplatelet therapy perioperatively.

A. Yasmine Kirkorian, BA, Betty L. Moore, PhD, Jodi Siskind, BS, and Ellen S. Marmur, MD, have indicated no significant interest with commercial supporters.

Many patients who present to the dermatologic surgeon for cutaneous surgery have other comorbidities for which they may be receiving anticoagulant or antiplatelet therapy. The perioperative management of such patients is a controversial topic in dermatologic surgery. Dermasurgeons must balance the risk of bleeding complications associated with continuing therapy versus the risk of thrombotic complications associated with cessation of anticoagulant therapy. Several prospective and retrospective studies have concluded that when bleeding complications occur, they are minor and rarely compromise wound healing or surgical outcome.¹⁻⁶ There have been numerous case reports of thrombotic events that were associated with the cessation of anticoagulation therapy.¹⁶⁻¹⁸ There is no current standard of care and the management of

anticoagulant and antiplatelet therapy varies widely among dermasurgeons and cutaneous surgeons from other specialties.

The goal of our study is to describe the current state of perioperative management of anticoagulant and antiplatelet therapy in Mohs surgery. The role of the discussion will be to guide physicians in decision making regarding the perioperative management of these therapeutic agents and to suggest recommendations based on evidence in the literature.

Materials and Methods

A questionnaire surveying current practice in perioperative management of anticoagulant and antiplatelet therapy was mailed to 720 dermasurgeons,

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members of the American College of Mohs Micrographic Surgery and Cutaneous Oncology (ACMMSCO). A mailing list of the complete membership was purchased from the ACMMSCO. Completion of the survey was voluntary and anonymous with no monetary compensation provided. The survey was reviewed by the Mount Sinai School of Medicine Institutional Review Board.

The questions interrogated physicians on the following topics: (1) years in practice; (2) number of procedures performed yearly; (3) continuation or discontinuation of aspirin (prophylaxis), aspirin (medically necessary), warfarin, nonsteroidal anti-inflammatory drugs (NSAIDs), and vitamin E; (4) time of discontinuation; (5) qualitative reasoning behind decision to continue or discontinue each anticoagulant or platelet inhibitor; and (6) the involvement of other physicians in determining how to manage the patient. The physicians were also asked to report on the number and type of thrombotic complications they had personally experienced in their own practices without any specific patient identifying information. The Wilcoxon rank sum was used to compare the median number of years in practice between surgeons who continue and discontinue each agent. The results were compared to those of a similar survey in 2002.

Results

A total of 271 of the 720 surveys were returned (response rate, 38%). Physicians were questioned about the number of specific procedures performed annually including excision, Mohs surgery, biopsy, blepharoplasty, and liposuction with the data displayed in Figure 1.

Most responders performed between 101 and 500 or more than 500 excisions (88%), Mohs surgeries (98%), and biopsies (93%). In contrast, very few responders performed 100 to 500 blepharoplasties (1%) or liposuctions (2%) yearly with no responders performing more than 500 cases of either procedure. Most physicians (88%) contacted the patient's

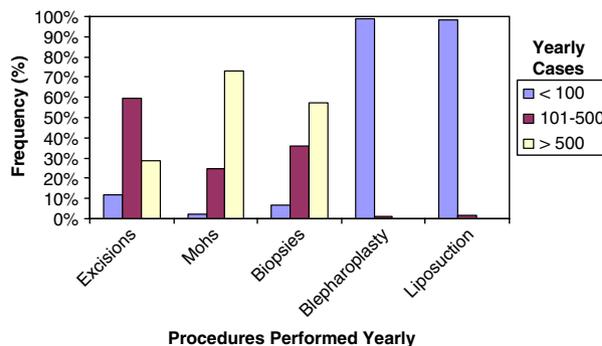


Figure 1. The frequency of various surgical procedures performed by dermatologists according to the number of cases performed yearly.

primary care physician or cardiologist to discuss anticoagulant therapy.

Physicians were asked to indicate which factors apply to their decision to discontinue anticoagulation perioperatively. These factors include: (1) anticoagulation leads to excessive bleeding during surgery; (2) excessive time/effort is required to control bleeding during and after surgery; (3) consideration for the patient's perspective (e.g., bleeding during surgery is scary); and (4) compromise of the post-surgical outcome. Of the responding physicians, 62% indicated the first factor, 52% indicated the second, 17% indicated the third, and 67% indicated the fourth as relevant to their decision making.

Physicians were also asked to report thrombotic events that occurred after surgery. The results are restricted to those events personally seen by the physician and do not include reports from colleagues or partners. The complications reported include 39 strokes, 19 myocardial infarctions, 17 cases of unstable angina, 25 transient ischemic attacks, 7 deep venous thromboses, 4 pulmonary emboli, and 15 deaths. A summary of the type and frequency of such events can be found in Table 1.

A comparison of the management of each of the therapeutic agents is provided in Figure 2 and may be referred to with each section. For each therapeutic agent, we compare the number of years in practice for physicians who continue and discontinue therapy.

TABLE 1. Thrombotic Events and Adverse Outcomes after Dermatologic Surgery

Type of event	Physician response (n)
Stroke (ischemic only, not hemorrhagic)	39
Myocardial infarction	19
Unstable angina	17
Transient ischemic attack	25
Deep venous thrombosis	7
Pulmonary embolus	4
Death	15

Aspirin (Prophylaxis/Not Medically Necessary)

Prophylactic aspirin is defined as that taken for pain relief or primary prophylaxis in the prevention of cardiovascular disease. Of the responding physicians, 49% always discontinue prophylactic aspirin perioperatively, 34% sometimes discontinue it, and 16% never discontinue it. The timing of discontinuation of prophylactic aspirin is summarized in Figure 3. The number of years in practice was not significantly different between the dermasurgeons who continue and discontinue prophylactic aspirin, medically necessary aspirin, warfarin, or NSAID therapy perioperatively.

Aspirin (Medically Necessary)

Medically necessary aspirin was defined as that prescribed to patients with a history of cardiovas-

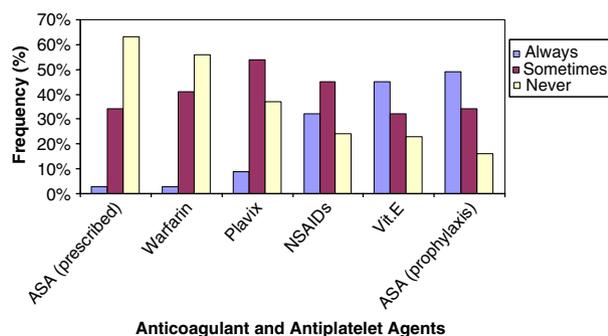


Figure 2. A comparison of management of various anticoagulant and antiplatelet agents according to frequency of discontinuation of each therapeutic agent.

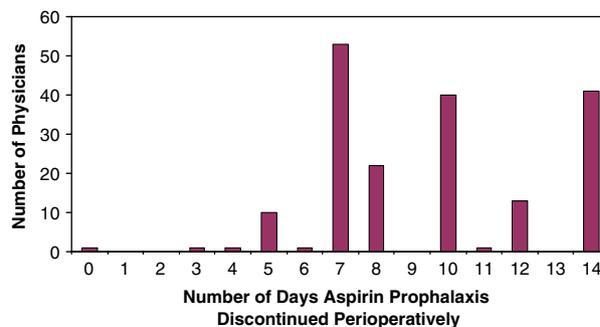


Figure 3. The number of physicians who discontinue prophylactic aspirin therapy perioperatively according to the number of days therapy is discontinued.

cular, thrombotic, or thromboembolic events. Of the responding physicians, 3% always discontinue medically necessary aspirin perioperatively, 34% sometimes discontinue it, and 63% never discontinue it. The timing of discontinuation of medically necessary aspirin is summarized in Figure 4.

Warfarin (Coumadin)

In contrast to aspirin, warfarin is prescribed and is defined as “medically necessary.” Of the responding physicians, 3% always discontinue warfarin perioperatively, 41% sometimes discontinue it, and 56% never discontinue it. The timing of discontinuation of warfarin is summarized in Figure 5.

NSAIDs

The therapeutic agents known as NSAIDs include ibuprofen, naproxen, and indomethacin. Of the

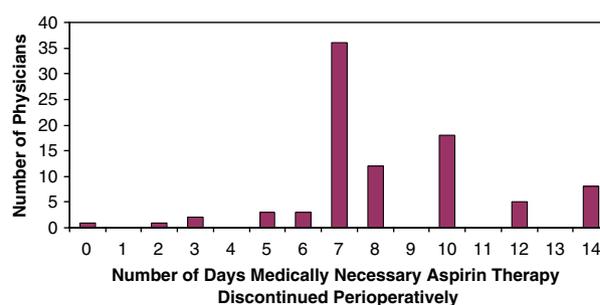


Figure 4. The number of physicians who discontinue medically necessary aspirin therapy perioperatively according to number of days the therapy is discontinued.

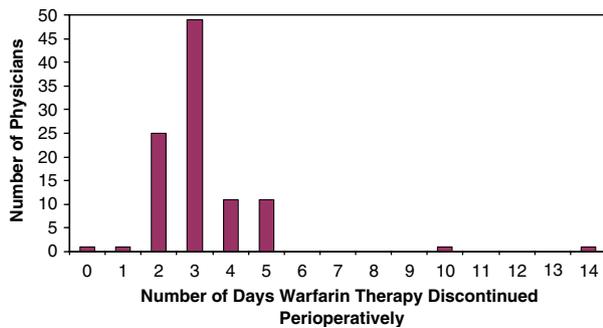


Figure 5. The number of physicians who discontinue warfarin therapy perioperatively according to the number of days the therapy is discontinued.

responding physicians, 32% always discontinue NSAIDs perioperatively, 45% sometimes discontinue them, and 24% never discontinue them.

Vitamin E

Of the responding physicians, 45% always discontinue vitamin E perioperatively, 32% sometimes discontinue it, and 23% never discontinue it. Physicians who have had more years in practice (median, 14 years; interquartile range, 6–17) are significantly more likely ($p = .003$) to continue vitamin E therapy perioperatively than physicians who have practiced for fewer years (median, 10 years; interquartile range, 4–15).

Clopidogrel (Plavix)

Although we did not directly ask about the antiplatelet agent clopidogrel, 78 physicians wrote this drug in the blank box for “other anticoagulants.” Of these responding physicians, 9% always discontinue clopidogrel perioperatively, 42% sometimes discontinue it, and 29% never discontinue it. The number of years in practice did not significantly affect the management of clopidogrel therapy.

Discussion

The purpose of the study is to describe the current state of management in Mohs surgery. A shift toward the maintenance of anticoagulation and antiplatelet therapy is supported by the evidence-based medicine

from the literature in dermatologic surgery as well as in other fields. In deciding whether or not to continue anticoagulation, dermasurgeons balance the risk of bleeding complications with the risk of thrombotic complications. The weaknesses of the study include a low response rate, a lack of prospective data, and a lack of information on the occurrence of bleeding complications. To address the latter issue, we have concluded a survey to assess the level of bleeding complications experienced by Mohs surgeons.

Bleeding Complications

A search of the dermatologic surgery literature revealed eight articles^{1–8} that examine the risk of bleeding complications with perioperative anticoagulation or antiplatelet therapy and the effect of these complications postoperatively. The majority of the articles conclude that anticoagulant and antiplatelet therapy should be continued because the surgical outcome is similar between control and anticoagulated patients. Kargi and coworkers,⁶ however, found that “cutaneous surgery in patients who receive warfarin is associated with a risk of major complication (e.g., persistent bleeding, wound hematoma, loss of skin graft, wound infection),” but concluded that minor surgery can be performed on patients taking warfarin as long as the surgeon is aware of the possibility of complications.

In our survey, more than half (67%) of doctors who discontinued therapy said that the “postsurgical outcome being compromised” was at least one of the contributing factors to their decision. This opinion among Mohs surgeons is not supported by the literature as described above.

This opinion may be due to several factors including the level of familiarity with the literature, belief that bleeding occurs despite the findings in the literature, and the potential that excessive bleeding, thus far undocumented, does occur in certain patients using anticoagulant or antiplatelet therapy. Although our survey did not specifically ask the respondents about

their familiarity with the dermatologic literature, our findings demonstrate a shift in anticoagulant management of medically necessary aspirin and warfarin, which is consistent with the current recommendations. Although some physicians may believe that excessive bleeding occurs despite findings in the literature, West and colleagues⁹ suggested that dermatologists cannot assess anticoagulation status of a patient by clinical inspection intraoperatively.

Another possibility is that excessive perioperative bleeding does occur. Syed and coworkers² did note an increase in the risk of minor bleeding with warfarin but determined that this bleeding did not affect surgical outcome. The results of our forthcoming survey will describe the incidence of such complications.

Thrombotic Complications

Stroke, myocardial infarctions, and death are among the thrombotic complications that may result from the discontinuation of anticoagulation perioperatively during cutaneous surgery. Many authors in the dermatologic surgery literature have concluded that the potential for such complications, which are viewed as life-threatening, outweighs the minor risk of excessive bleeding. This point of view is supported by the literature in other fields including a survey¹⁰ of 473 Canadian internists and cardiologists, which indicated that the “risk of thromboembolism, but not the risk of bleeding, influenced the aggressiveness of anticoagulant management.” It is possible that some perioperative thrombotic complications are the result of underlying disease in the coagulopathic patient independent of anticoagulation status. One study¹¹ of 6,108 patients with nonvalvular atrial fibrillation treated with or without warfarin defined a rate of 7.92 thromboembolic events per 100 person-years for patients treated with warfarin. Nevertheless, this same study concluded a risk of 10.69 thromboembolic events per 100 person-years in patients not treated with warfarin. This rate was significantly higher ($p < .001$) than in the untreated group indicating that, even

within the context of the high-risk patient, patients who do not receive anticoagulation therapy are more likely to experience a thromboembolic event.

Certain authors¹² have suggested that the connection between cessation of anticoagulation or antiplatelet therapy and the thrombotic event is tenuous and cannot be proven without a large-scale prospective trial. There is evidence for such a connection, however, as well as a proposed mechanism for the precipitation of thrombotic events after cessation of anticoagulation perioperatively.^{13–16}

Two large-scale retrospective analyses^{14,15} in the cardiovascular literature describe an increased risk of thrombotic complications with cessation of anticoagulant or antiplatelet therapy. In a study of myocardial infarction after aspirin cessation,¹³ the mechanism proposed for the provocation of a thrombotic event is the existence of a rebound state during the 2-week period of platelet recovery of function following cessation of aspirin therapy.

The dermatologic surgery literature^{12,17–19} also supports the correlation between cessation of anticoagulant and antiplatelet therapy and the incidence of thrombotic events. Kovich and Otley¹⁹ calculated an incidence rate of 1 in 6,219 cases upon discontinuation of warfarin and 1 in 21,448 cases with discontinuation of aspirin therapy. They found that 24% of responding physicians had experienced a thrombotic event during their career. The authors concluded that half of all dermatologic surgeons are likely to experience a thrombotic complication. Our results support this assertion with 82 Mohs surgeons reporting 126 thrombotic events, including 39 strokes, 19 myocardial infarctions, 17 cases of unstable angina, 25 transient ischemic attacks, 7 deep venous thromboses, 4 pulmonary emboli, and 15 deaths.

The physicians responding to our survey may have underreported the number of thrombotic complications. Patients with such complications may have presented directly to the emergency room and may

not have notified the reporting physician. Because the number of thrombotic events after discontinuation may be underreported, the continuation of anticoagulation perioperatively to prevent the chance of such complications may be important.

Evidence from Other Fields

The decision to maintain anticoagulant and antiplatelet therapy perioperatively is supported by the literature in several other fields, including ophthalmology,^{20,21} dentistry,^{22,23} and gastroenterology.²⁴ Of particular interest to dermatologists are the latest recommendations in plastic surgery. Many Mohs surgeons refer complicated repairs to their colleagues in other surgical fields, and it is important to be aware of the recommendations in other literature. Interestingly, a review article in the plastic surgery literature, published by Muskett and coworkers²⁵ in 2005, refers to the dermatologic surgery literature and concludes that for many minor or cutaneous procedures, anticoagulant and antiplatelet inhibitors do not need to be discontinued perioperatively. No current guidelines have been accepted by these surgical specialties, and this may pose a dilemma when referring between fields.

Conclusion

In 2002, Kovich and Otley²⁶ published an important survey that provided recommendations for the management of anticoagulation and antiplatelet therapy perioperatively in dermatologic surgery. In 2005, we compared our results to theirs, with their permission, to define the current state of practice and to demonstrate changes in the management of these therapeutic agents since 2002.

The survey by Kovich and Otley found that 70% of Mohs surgeons continue medically necessary aspirin therapy but these physicians discontinue aspirin if not medically necessary (what we define as “prophylactic” aspirin). Furthermore, they found that 26% of Mohs surgeons always discontinue aspirin therapy regardless of medical indication.

The 2005 survey results indicate a large divide between management of prophylactic aspirin, taken for primary prevention or pain relief, and medically necessary aspirin, prescribed to patients with a history of cardiovascular, thrombotic, or thromboembolic events. Although the majority (83%) of Mohs surgeons discontinue prophylactic aspirin at least some of the time, only 37% discontinue medically necessary aspirin in this manner with a minority (3%) who always discontinue aspirin therapy perioperatively. Overall results demonstrate that surgeons are more likely to continue aspirin therapy perioperatively.

The 2002 study found that most (80%) Mohs surgeons discontinue warfarin therapy perioperatively at least some of the time. Our results indicate that less than half (44%) of surgeons discontinue such therapy today. This finding represents the most dramatic change in the perioperative management of anticoagulation, with a distinct shift toward the maintenance of warfarin therapy.

The results regarding management of NSAIDs and vitamin E are less clear than those for aspirin and warfarin. This may reflect the fact that neither NSAIDs nor vitamin E were viewed as medically necessary agents. NSAIDs are often used as analgesics to combat arthritic joint pain. Seventy-seven percent of physicians discontinue these agents at least some of the time. Among these physicians, several commented that they preferred to discontinue NSAIDs and replace with acetaminophen or an opioid analgesic to maintain pain control in their patients.

Vitamin E and other herbal supplements have been the subject of several articles in the recent dermatologic literature.²⁷⁻²⁹ One such study by Collins and Dufresne²⁸ investigated the incidence of dietary supplement use in patients undergoing Mohs surgery. The authors found that 50% of patients admitted using some form of herbal supplementation when questioned specifically but only one third of these patients reported such usage on the initial questionnaire.

Vitamin E along with other herbal supplements such as garlic, ginkgo biloba, and ginseng cited by physicians in our survey are known to have antiplatelet properties. Vitamin E disrupts platelet aggregation and adhesion—particularly when taken concomitantly with other antiplatelet agents such as aspirin.²⁹ We found that 32% of Mohs surgeons sometimes and 45% always discontinue vitamin E therapy perioperatively. In their comments regarding this agent, some physicians indicated “intraoperative bleeding” as the reason for discontinuation while others described vitamin E as having no clinical benefit. Despite numerous small trials and case reports, there is still a lack of evidence for the use of vitamin E in the treatment of dermatologic disorders.²⁷

Numerous large-scale, randomized trials have proven the benefit of clopidogrel (Plavix), an antiplatelet agent, in reducing the risk of thrombotic events.^{30–32} Although we did not ask about clopidogrel specifically in our survey, 78 physicians included comments about the management of this agent indicating its importance in dermatologic surgery. Mohs surgeons are less likely to always discontinue clopidogrel (9%) than they are to discontinue prophylactic aspirin (49%), NSAIDs (32%), or vitamin E (45%). Several physicians mentioned that the level of perioperative bleeding in patients treated with clopidogrel is equal to or more significant than that seen with patients treated with aspirin. This assertion is supported by the literature in which the combination of aspirin and clopidogrel has been found to lead to excessive bleeding, outweighing the benefit of reduction of risk of thrombosis.³³

The management of antiplatelet agents is further complicated by the widespread use of drug-eluting coronary stents. Patients with such stents must maintain long-term therapy with aspirin and clopidogrel. The risk of late stent thrombosis appears to be greater in these patients in comparison to patients who were treated with nondrug eluting (e.g., bare-metal) stents.³⁴ This represents a group of patients for whom the continuation of antiplatelet therapy is essential.

In contrast, the recent CHARISMA trial³⁵ suggests that patients who are at a lower risk for coronary artery disease, and who have not been treated with a coronary stent, may not benefit from clopidogrel altogether; in such patients, cessation of antiplatelet therapy is likely to be beneficial. Given the rapid evolution of this field, it may be prudent for dermasurgeons to consult with the patient’s cardiologist, especially in those cases where the patient may have received a stent.

Recommendations for the Management of Anticoagulant and Antiplatelet Agents Perioperatively in Cutaneous Surgery

The continuation of medically necessary anticoagulant and antiplatelet therapy is becoming the standard of care in the field of Mohs surgery. In most patients, Mohs surgeons should continue medically necessary anticoagulant and antiplatelet therapy perioperatively. This conclusion is supported by this survey and the literature. Exceptions will occur and all decisions are ultimately up to the discretion of the operating physicians.

Eventually, evidence-based medicine may prove that it is safe to discontinue anticoagulation in the majority of low-risk cardiac patients. The literature and the number of adverse events described in this study (126), however, support the continuation of medically necessary anticoagulation.

Dermsurgeons should document a current international normalized ratio (INR) value in patients treated with warfarin. There is no official recommendation for an acceptable range of perioperative INR values in the literature, but many dermsurgeons request the INR be between 2.0 and 3.0 at the time of cutaneous surgery unless otherwise specified by the prescribing physician. Dermsurgeons should use meticulous technique when performing surgery on the anticoagulated patient to minimize the risk of bleeding.

There is no evidence-based medicine for the management of non-medically necessary anticoagulants,

including prophylactic aspirin, NSAIDs, vitamin E, and other herbal supplements. The management of these agents should be at the physician's discretion.

Further evidence-based medicine is necessary to set more strict guidelines for the perioperative management of anticoagulation and antiplatelet therapy. These guidelines are important to set safe standards throughout the dermatologic surgery community with regard to medically necessary anticoagulant and antiplatelet therapy.

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