Acta Derm Venereol 2015; 95: 845–847

SHORT COMMUNICATION

Preoperative Management of Antithrombotic Medication in Mohs Micrographic Surgery

Xiaomeng Liu[1,2], Luca Lammers[3], Patty J. Nelemans[4], Klara Mosterd[1,2] and Nicole W. J. Kelleners-Smeets[1–3]

[1]Department of Dermatology, [2]GROW, School for Oncology and Developmental Biology, Maastricht University Medical Centre, P. Debyelaan 25, NL-6229 HX Maastricht, [3]Department of Dermatology, Catharina Hospital, Eindhoven, and [4]Department of Epidemiology, Maastricht University, Maastricht, The Netherlands. E-mail: xiaomeng.liu@mumc.nl

Accepted Mar 3, 2015; Epub ahead of print Mar 10, 2015

Many patients presenting for dermatologic surgery use antithrombotic medication. It remains controversial whether or not this medication should be withheld prior to cutaneous surgery. Different studies, including one meta-analysis, have assessed the risk of bleeding when antithrombotic medication was continued and showed conflicting results (1–8). Furthermore, case reports illustrated the potential life-threatening risk of temporary discontinuation of antithrombotic medication (9–11).

We evaluated the frequency of postoperative haemorrhage and thrombotic events in patients continuing their antithrombotic medication with those temporarily withholding this medication prior to Mohs micrographic surgery.

MATERIAL AND METHODS

We retrospectively retrieved information from patients who underwent Mohs micrographic surgery from July 2010 to July 2012 at the Maastricht University Medical Centre. During the first year a regional guideline required platelet inhibitors (PI's) to be discontinued 7 to 10 days prior to surgery and Vitamin K antagonists (VKA's) to be tapered to reach an International Normalized Ratio of 2.0 or less 24 h prior to surgery. As a result of a national discussion, the guideline was changed from July 2011. Patients did not need to discontinue their antithrombotic medication with the exception of surgery performed at the medial canthus of the eye. In addition to patient and operation characteristics, we extracted information on postoperative adverse events including bleeding, infection, necrosis and wound dehiscence as well as vascular events within 7 days postsurgery. Patients with known bleeding diathesis (such as hemophilia or von Willebrand disease) were excluded. Bleeding was defined as severe if it required coagulation and/or suturing, as moderate if it required a new pressure dressing, and as mild if it could be resolved by telephone advice. Frequency of bleeding was compared amongst the 3 groups: patients continuing their anti-thrombotic medication, patients discontinuing their anti-thrombotic medication and patients not using anti-thrombotics (controls). This study protocol followed the principles of the 1975 Declaration of Helsinki and was approved by the institution's medical ethical committee.

The χ^2-square test or Fisher's exact test was used to test for statistical significance of differences in proportions. For continuous variables the *t*-test for independent samples or Mann-Whitney *U* test was used. Multivariate logistic regression analysis was performed to evaluate the relationship between haemorrhage and antithrombotic therapy and to adjust for potential confounders. *p*-values ≤ 0.05 were considered to indicate statistical significance. Analysis was performed using IBM SPSS Statistics version 20.0.0.1.

RESULTS

A total of 598 Mohs procedures in 534 patients were performed in the study period. After excluding 175 procedures (151 patients) due to unclear documentation regarding the use and/or management of antithrombotic medication, 423 procedures (383 patients) were left for analysis. Baseline characteristics are shown in Table I. Patients using antithrombotic medication were significantly older and were more often male than patients not using them. In the group that discontinued the antithrombotic medication, more operations were done in the eye region, reflecting adjustment to the protocol. There was

Table I. *Characteristics of included procedures*

Characteristics	Antithrombotics discontinued	Antithrombotic continued	No antithrombotics (controls)	*p*-value
Procedures, *n*	59	84	280	
Age, years, mean ± SD	75.5 ± 9.4	76.3 ± 8.8	66.0 ± 11.9	<0.001
Sex, *n* (%)				0.041
Male	36 (61.0)	52 (61.9)	136 (48.6)	
Female	23 (39.0)	32 (38.1)	144 (51.4)	
Anticoagulant, *n* (%)				n.a.
PI	24 (40.7)	52 (61.9)	n.a.	
VKA	31 (52.5)	18 (21.4)	n.a.	
2 x PI	1 (1.7)	11 (13.1)	n.a.	
VKA + PI	3 (5.1)	2 (2.4)	n.a.	
Unknown agent	0 (0.0)	1 (1.2)	n.a.	
Localization, *n* (%)				<0.001
Eye	16 (27.1)	5 (6.0)	33 (11.8)	
Nose	23 (39.0)	25 (29.8)	129 (46.1)	
Cheek	6 (10.2)	9 (10.7)	46 (16.4)	
Ear	5 (8.5)	20 (23.8)	24 (8.6)	
Other	9 (15.3)	25 (29.8)	48 (17.1)	
Diameter defect, mm, mean ± SD	25.9 ± 14.4	25.4 ± 14.3	22.6 ± 13.2	0.094
Reconstruction, *n* (%)				0.122
Secondary granulation	5 (8.5)	12 (14.3)	25 (8.9)	
Primary closure	17 (28.8)	33 (39.3)	73 (26.1)	
Plasty	29 (49.2)	28 (33.3)	119 (42.5)	
Graft	2 (3.4)	7 (8.3)	33 (11.8)	
Postponed closure	4 (6.8)	4 (4.8)	22 (7.9)	
Unknown	2 (3.4)	0 (0.0)	8 (2.9)	

SD: standard deviation; PI: platelet inhibitor; VKA: vitamin-K antagonist; n.a.: not applicable.

 doi: 10.2340/00015555-2090
 ISSN 0001-5555

Table II. *Number of procedures with varying severity of postoperative haemorrhage in relation to use of antithrombotics or not*

Patient group	Mild *n* (%)	Moderate *n* (%)	Severe *n* (%)	Total *n* (%)
Antithrombotics discontinued (*n*=59)	0 (0.0)	2 (3.4)	1 (1.7)	4 (6.8)[a]
Antithrombotics continued (*n*=84)	2 (2.4)	2 (2.4)	2 (2.4)	6 (7.1)
No antithrombotics (*n*=280)	1 (0.4)	5 (1.8)	1 (0.4)	8 (2.9)[a]

[a]In one patient the type of intervention was not registered.

no statistically significant difference in the diameter of the surgical defect or the closure type among all 3 groups.

A total of 18 haemorrhages in 18 patients were recorded (4.3% of procedures). The haemorrhage rates and their severity are shown in Table II. No life-threatening bleeding occurred. After adjustment for age, which was a significant co-variant, the relative risk (RR) of haemorrhage in patients discontinuing their medication compared to controls was 3.52 (95% confidence interval, CI 0.93–13.38) and in patients continuing their medication compared to controls 3.84 (95% CI 1.13–12.98). No wound dehiscence, necrosis or infection occurred in patients who experienced postoperative haemorrhage[1].

Two vascular events were identified. One patient withheld acenocoumarol 4 days preoperatively and developed a cerebellar infarction three days after surgery. Another patient discontinued carbasalatecalcium 7 days preoperatively and experienced a myocardial infarction during the operation.

DISCUSSION

For daily practice, the RR of post-operative haemorrhage in patients continuing versus discontinuing their antithrombotic medication is of major relevance. Only one prior study focussed on this comparison and found similar risks in both groups which is in agreement with our findings (12). In this earlier study, the decision to stop antithrombotic medication or not was left to the treating physician which could potentially have introduced a selection bias. In our study this selection bias was minimized due to a uniform protocol. However, patients using antithrombotics are probably more aware of the risk of bleeding and are more likely to contact a doctor. This could also have contributed to the higher rate of registered bleeding in patients using antithrombotics.

Some studies have concluded that the use of VKA did increase the risk of bleeding while that of aspirin (a PI) did not (4, 13). In our study, both patients on VKA and PI had an increased risk of bleeding compared with control patients (results not shown). Nonetheless, we have shown that the haemorrhage rate was similar in patients continuing and discontinuing their VKA. This is important for decision making prior to dermatologic surgery. Two other studies have suggested that combinations of different agents could increase the rate of bleeding complications (7, 8). In this study, none of the patients who received a combination of antithrombotics had experienced a haemorrhage. This group was however small.

In our study, two patients who had discontinued their anticoagulation developed a vascular event within one week after surgery. Although these complications are rare, they should not be ignored due to the life-threatening potential. On the contrary, bleeding complications are mostly not life-threatening but can be extremely stressful for the patient and a potential threat for wound healing. Nevertheless, in this study, no dehiscence or necrosis appeared in the group with post-operative haemorrhage, indicating that this threat is minimal.

There are limitations to this study that should be noted. First of all, due to the retrospective design, data are missing and a limited sample prohibited potentially relevant sub-group analyses, such as the method of wound closure. The limited sample size is also associated with a reduced power to detect statistically significant results. Secondly, the recorded severity of the bleeding is subjective, but the potential misclassification of bleeding severity does not affect the results concerning total number of haemorrhages. Other possible confounders, such as patients coping ability or surgeon's skill could not be addressed in this paper due to its retrospective design.

In conclusion postoperative haemorrhage balancing both risks and vascular events, favours continuation of anticoagulants in dermatologic surgery. Future prospective studies are needed to confirm our results.

The authors declare no conflicts of interest.

REFERENCES

1. Eichhorn W, Barsukov E, Al-Dam A, Grobe A, Smeets R, et al. Postoperative bleeding risk for cutaneous surgery in the head and neck region with continued phenprocoumon therapy. J Craniomaxillofac Surg 2014; 42: 608–611.
2. Shalom A, Wong L. Outcome of aspirin use during excision of cutaneous lesions. Ann Plast Surg 2003; 50: 296–298.
3. Dhiwakar M, Khan NA, McClymont LG. Surgical resection of cutaneous head and neck lesions: does aspirin use increase hemorrhagic risk? Arch Otolaryngol Head Neck Surg 2006; 132: 1237–1241.
4. Dixon AJ, Dixon MP, Dixon JB. Bleeding complications in skin cancer surgery are associated with warfarin but not aspirin therapy. Br J Surg 2007; 94: 1356–1360.
5. Lewis KG, Dufresne RG, Jr. A meta-analysis of complications attributed to anticoagulation among patients following cutaneous surgery. Dermatol Surg 2008; 34: 160–164; discussion 164–165.
6. Bordeaux JS, Martires KJ, Goldberg D, Pattee SF, Fu

[1]In patients using PI (*n*=88) the RR of postoperative haemorrhage was 1.20 (95% CI 0.12–12.21) when comparing patients continuing versus discontinuing. In patients using VKA (*n*=54), the RR of postoperative haemorrhage in continuing compared to discontinuing was 1.32 (95% CI 0.19 –9.24).

P, et al. Prospective evaluation of dermatologic surgery complications including patients on multiple antiplatelet and anticoagulant medications. J Am Acad Dermatol 2011; 65: 576–583.
7. Cook-Norris RH, Michaels JD, Weaver AL, Phillips PK, Brewer JD, et al. Complications of cutaneous surgery in patients taking clopidogrel-containing anticoagulation. J Am Acad Dermatol 2011; 65: 584–591.
8. Shimizu I, Jellinek NJ, Dufresne RG, Li T, Devarajan K, et al. Multiple antithrombotic agents increase the risk of postoperative hemorrhage in dermatologic surgery. J Am Acad Dermatol 2008; 58: 810–816.
9. Alam M, Goldberg LH. Serious adverse vascular events associated with perioperative interruption of antiplatelet and anticoagulant therapy. Dermatol Surg 2002; 28: 992–998; discussion 998.
10. Khalifeh MR, Redett RJ. The management of patients on anticoagulants prior to cutaneous surgery: case report of a thromboembolic complication, review of the literature, and evidence-based recommendations. Plast Reconstr Surg 2006; 118: 110e–117e.
11. Schanbacher CF, Bennett RG. Postoperative stroke after stopping warfarin for cutaneous surgery. Dermatol Surg 2000; 26: 785–789.
12. Otley CC, Fewkes JL, Frank W, Olbricht SM. Complications of cutaneous surgery in patients who are taking warfarin, aspirin, or nonsteroidal anti-inflammatory drugs. Arch Dermatol 1996; 132: 161–166.
13. Kargi E, Babuccu O, Hosnuter M, Babuccu B, Altinyazar C. Complications of minor cutaneous surgery in patients under anticoagulant treatment. Aesthetic Plast Surg 2002; 26: 483–485.