

Bleeding complications in cutaneous surgery for patients on warfarin who have skin cancer of the head and neck

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Abstract

Many patients who have operations on the head and neck for skin cancer also take warfarin to prevent thromboembolic events, and there is still debate about whether treatment should be continued, adjusted, or temporarily stopped. The main concern is to balance the risk of haemorrhagic and thromboembolic events. In this prospective controlled study we compared bleeding complications in operations for skin cancer of the head and neck between 86 patients who took warfarin (100 tumours) and 87 (100 tumours) who did not. Surgeons of different grades did the operations under the guidance of the same consultant. All those on warfarin had above normal international normalised ratios (INRs) (mean (SD) 2.5 (0.51), mode 2.6, range 1.1–4.0). In the warfarin group 8% of excisions had a bleeding complication compared with 9% in the control group. One patient in each group suffered a severe bleed that required a return to theatre. The difference in tendency to bleed between the groups was not significant ($p=0.30$), and the site and type of reconstruction did not influence the risk of bleeding significantly. This study shows that patients on warfarin who are within the normal therapeutic range, can be operated on safely for skin cancer by all levels of trained staff.

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Keywords: Facial skin cancer; Warfarin; Bleeding complications

Introduction

The incidence of skin cancer is increasing¹ because people are living longer² and there is greater exposure to solar radiation.^{3,4} Older people also have an increased risk of cardiovascular problems, which may require treatment with anticoagulant drugs such as warfarin.

Warfarin acts by inhibiting vitamin K-dependent clotting factors, and thereby prevents the formation of a fibrin clot. Primary haemostasis because of vasoconstriction and platelet aggregation occurs normally, and it is therefore logical to assume that patients on warfarin have an increased risk of bleeding postoperatively rather than perioperatively.

Although some studies show increased intraoperative⁵ and postoperative bleeding,^{6–8} several have concluded that cutaneous surgery is safe if the international normalised ratio (INR) is maintained in between 2 and 3.5.⁹ However, there are serious limitations in study design as exemplified by Alcalay who compared 16 patients on anticoagulants with a control group of 1074.⁹ A high proportion of the patients on warfarin had primary closure of the surgical defect (69%) which makes haemostasis easier, and as the trunk and extremities,

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which are less well vascularised than the head and neck were operated on, the risk of bleeding is theoretically reduced.

Blasdale and Lawrence⁸ attempted to correlate the risk of bleeding with perioperative INR, but found that although the risk was increased postoperatively, it did not seem to be proportional to the INR. Although it was not their aim, the study does not indicate clearly whether it is safe for patients to continue warfarin treatment when they have cutaneous operations as 22% of them had missed doses either at their doctor's suggestion or on their own initiative.

To balance the risk of bleeding, there is a high risk of a serious thromboembolic event if warfarin is stopped or reduced.⁵ Traditionally, surgeons doing cutaneous operations have either stopped or reduced the dose,¹⁰ and more recent evidence suggests that this practice has not changed.¹¹ The risk is in the region of only 1%,¹² but the potential severity of such an event gives cause for thought. Other surgical disciplines have concluded that it is safe to proceed with certain operations if the INR is below 4 – for example, dental surgery.¹³ Bleeding can be managed adequately with local measures such as extra sutures, use of coagulant dressings, or cautery.

We aimed to find out whether patients on anticoagulants with an INR of less than 4 could have cutaneous operations without unnecessarily increasing the risk of serious thromboembolic events.

Methods

This multicentre prospective controlled study was done over 3 years under the guidance of one consultant, but surgeons of different grades did the operations (excision and reconstruction). This more accurately reflects the “real life” spread of patients, techniques, and surgeons.

All patients on warfarin who had skin cancers excised from the head and neck were included. Those who had primary closure, externalised flaps such as the paramedian, and split thickness skin grafts, were excluded because of the ease of haemostasis in the case of primary closure, and because highly vascular oozing wounds routinely require further haemostatic attention in the case of external flaps and donor sites for split thickness grafts. Reconstruction was done with local flaps, or full thickness (Fig. 1) or composite grafts.

A group of matched patients who were not on warfarin and who had comparable operations done by the same surgeons was included as a control group. At York and Harrogate hospitals one consultant, 2 specialty registrars in training under supervision (each year), and 3 specialty doctors, did the operations. A single consultant did all the operations in Gloucester.

INR samples for the warfarin group were taken on the day of operation unless they had been done as part of the patient's routine or elective warfarin control less than 2 days earlier.

Operations were done if the INR was less than 4, which matches the normal upper limit of the therapeutic range for



Fig. 1. Full thickness skin graft.

most indicated medical conditions (the risk of bleeding complications significantly increases when the INR is 5 or over³). In all cases, 2% lidocaine with 1:80,000 adrenaline was used with or without intravenous sedation including patients who had a general anaesthetic. The surgeon was aware of the anti-coagulation status and the INR of each patient. No special measures were taken to achieve haemostasis in patients on warfarin other than careful bipolar diathermy, which was used routinely in all cases. No dressings were routinely used except pressure dressings and head bandages, which were used in patients who had helical rim advancement flaps of the ear; proflavine and cotton wool, or Allevyn (Smith and Nephew) stabilisation packs, which were applied to full thickness skin grafts.

Patients were seen postoperatively before discharge from the ward, and were reviewed by a member of the surgical team at the nurse wound clinic in outpatients between 6 and 8 days later. They were examined for complications and questioned about bleeding since the operation. Complications were graded as mild (could be stopped using pressure alone), moderate (required simple intervention by a doctor such as sutures or a haemostatic agent), or severe (required a return to theatre or other serious intervention).

Data were collected at the time of operation and at follow-up using our own data collection tool (details available from the author). Those collected at the time of operation were placed in the notes as an aide-mémoire at follow-up. They were then entered into a MySQL[®] database (Oracle Corporation, Redwood Shores, USA).

Statistical analysis

Statistical analysis was carried out by J.Gibbons MPhys, 2nd Year PhD student, mathematics department, York University. Student's *t*-test was used to test the null hypothesis that there is no difference between the control and warfarin groups. The one-tailed *p* value was then calculated. A probability of less than 0.05 was needed to reject the null hypothesis. When *t* was more than zero the warfarin group had a lower incidence



Fig. 2. Karapandzic flap.

of bleeding complications although it was not necessarily significant, whereas the incidence was higher when t was less than zero. Data analysis was based on the number of tumours rather than the number of patients. Some patients had single procedures on multiple occasions, often separated by years, while others had multiple procedures at a single visit.

Results

A total of 173 patients had 200 cutaneous tumours excised. In the warfarin group, 86 patients had 100 tumours excised between 2009 and 2012, and in the control group, 87 consecutive patients had 100 tumours excised between 2011 and 2012.

The most common lesion was basal cell carcinoma ($n = 140$, 70%), followed by squamous cell carcinoma ($n = 43$, 22%) and other ($n = 17$, 9%). This correlates with Baxter et al. who reported that 75–80% of all non-melanoma skin cancers were basal cell carcinomas.³

All patients in the warfarin group had above normal INR (mean 2.5, range 1.1–4.0, mode 2.6). It was between 1.0 and 1.9 in 17, between 2.0 and 2.9 in 67, and between 3.0 and 4.0 in 16. The most common medical reason for taking warfarin was atrial fibrillation ($n = 70$), followed by deep vein thrombosis ($n = 12$), pulmonary embolism ($n = 6$), artificial heart valves ($n = 5$), and other ($n = 7$).

Most repairs were done using full thickness skin grafts (34%) and advancement and rotation flaps (40%). Transposition – for example, rhomboid flaps, accounted for 16% of repairs, while other reconstructions, such as perichondrial cutaneous grafts and Karapandzic flaps, made up the remaining 10%. Two Karapandzic flaps were done in the warfarin group and neither case had a bleeding complication (Fig. 2).

There were 8 bleeding complications in the warfarin group and 9 in the control group (Table 1). One patient in the warfarin group had 2 bleeding complications: mild bleeding immediately postoperatively and again in the first week.

The site most affected was the ear in both groups (Table 2) and full thickness skin grafts were most commonly affected

Table 1

Bleeding complications by group, timing, and severity (100 operations in each group). There were no complications at outpatient review 7 days later.

	Warfarin	No warfarin	t value	p value
Immediately postoperatively				
Mild	2	3	0.45	0.33
Moderate	0	1	1.01	0.16
Severe	0	1	1.01	0.16
Within first week				
Mild	5	4	-0.34	0.37
Moderate	0	0	–	–
Severe	1	0	-1.01	0.16

Table 2

Complications by site.

Site	No warfarin	Warfarin	t value	p value
Ear	2	3	-0.45	0.33
Scalp	2	1	0.58	0.28
Temple	1	1	–	–
Nose	1	0	1.01	0.16
Cheek	2	0	1.43	0.08
Forehead	1	0	1.01	0.16
Preauricular	0	1	-1.01	0.16
Mastoid	0	1	-1.01	0.16
Total	9	7	0.52	0.30

(Table 3). Procedures done by specialty doctors had the highest percentage of complications in patients on anticoagulants, but the lowest rate in the control group (Table 4).

Discussion

In our study, patients in the warfarin group had fewer bleeding complications than those in the control group, and severe complications that required a return to theatre for evacuation of a haematoma occurred only once in each group. The INR for the patient on warfarin was only 2.3 so it seems that warfarin can be continued safely if the INR is below 4.

As the risk of bleeding was comparable in both groups, it indicates that other factors influence the risk in patients undergoing cutaneous operations. Previous studies have corrected for age and excluded this as a factor. If complex Karapandzic flaps can be done in patients on warfarin, then the risk of bleeding in cutaneous surgery can be managed safely even in those taking anticoagulants.

Operations involving the ear had the highest number of mild complications in both groups, which is no surprise to surgeons who treat facial skin cancers in this highly vascular and complex region. In reconstructions of the ear only helical rim advancement techniques were used and no simple wedge excisions were done. It is our practice to place a head bandage for a minimum of 24 h on patients who have had flap repair after excision of tumour from the ear.

It could therefore be deduced that factors such as site, method of repair, experience of the surgeon, and other factors that affect the patient, have a greater bearing on the risk of

Table 3
Complications by type of reconstruction.

	No warfarin	Warfarin	Total	<i>t</i> value	<i>p</i> value
Full thickness skin graft	3	5	8	−0.72	0.24
Rim advancement	1	2	3	−0.58	0.28
Rotation flap	3	0	3	1.76	0.04
Rhomboid flap	1	0	1	1.01	0.16
Flip-flop flap	1	0	1	1.01	0.16

Table 4
Total operations and complications by grade of surgeon.

Grade	Warfarin		No warfarin		<i>t</i> value	<i>p</i> value
	No. of operations	Complications	No. of operations	Complications		
Consultant	20	2	25	3	0.21	0.42
Associate specialist	29	1	15	1	0.44	0.33
Registrar	16	0	44	5	2.38	0.01
Specialty doctor	12	3	11	0	−2.00	0.04
Clinical assistant	1	0	0	0	–	–
Hospital practitioner	9	0	0	0	–	–
Not recorded	13	1	2	0	−1.04	0.16

bleeding during and after cutaneous operations on the head and neck than anticoagulation with warfarin.

The authors acknowledge that the reliability of the data might have been improved if the surgeon had been blinded to the anticoagulation status of the patient as this knowledge may have led to a slightly more careful approach to haemostasis. However, this operation is routine and normal practice in our department, and the same standards of surgical practice, tissue handling, and haemostasis, were applied in both groups.

This study provides evidence that all levels of trained staff can safely do most cutaneous facial operations and reconstructions for skin cancer in patients on anticoagulants if their INR is within the normal therapeutic range.

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