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Application of the TachoComb to the patients receiving oral anticoagulants after tooth extraction

Zastosowanie TachoComb po ekstrakcji zębów u pacjentów przyjmujących antykoagulanty

INTRODUCTION

Extracting teeth in patients who take oral anticoagulant regularly for a long time still remains an important and often controversial aspect of dental practice. In such patients, prolonged bleeding occurs after tooth extraction or – not infrequently – post-extraction hemorrhage difficult to stop. Discontinuation of oral anticoagulants before tooth extraction and an interruption of anti-thrombotic treatment increase the risk of thrombotic- embolic complications. On the other hand, continuation of oral anticoagulant therapy during the pre- and post-extraction period results in prolonged post-extraction bleeding as well as hemorrhagic complications, which in turn slows down the post-extraction wound healing [1, 8, 14].

In the literature on stomatology, a discussion is conducted regarding the question whether to discontinue oral anticoagulants or to continue anti-thrombotic therapy before and after the extraction. Some authors claim that in the patients qualifying for the oral cavity sanation and surgical stomatological treatment more attention should be paid to obtaining effective post-surgical haemostasis and appropriate local dressing of the post-extraction wounds, without any changes to the administration of the anti-thrombotic medications before and after tooth extraction. Such an approach is facilitated by the introduction of further new medications and haemostatic formulas to be applied locally. Among them, of special interest is the haemostatic surgical dressing manufactured by the Hafslund Nycomed company, namely the TachoComb fibrinous-collagenous tissue adhesive, which so far had been used mainly for the treatment of hepatic damage or injuries [4, 5, 7, 10-12, 14].

The aim of this study is to present the authors' own observations and share his experience concerned with the application of the TachoComb hemostatic formula to the local treatment and prevention of bleeding after tooth-extraction in patients receiving prophylactically administered oral anticoagulants. Furthermore, the authors' intention was to find out whether the application of the TachoComb formula to the local treatment of post-extraction wounds in patients on oral anticoagulants was an effective method of obtaining haemostasis without having to interrupt an anti-thrombotic therapy [7-9, 11, 12].

MATERIAL AND METHODS

Fibrinous-collagenous tissue adhesive in the form of the dry TachoComb formula was applied after tooth extraction to 190 patients using prophylactic oral anticoagulants, who had been treated during the period of the last eight years at the Maxillofacial Surgery Outpatient Clinic and Ward of the Regional Specialized Hospital in Rzeszów.

Observations were made of 89 females and 101 males, at the age from 19 to 74, receiving oral anticoagulants taken prophylactically due to cardiac conditions, such as ischemic heart disease, post-myocardial infarction condition, atrial fibrillation, after or before cardiac surgical treatment, as well as other conditions requiring anti-thrombotic prophylactics. The data on the general characteristics of the treated patients are presented in Table 1.

Table 1. Sex and age of the treated patients

Group	Number of patients	Sex		Age						
		F	M	Min.-Max.	< 30	31 – 40	41 – 50	51 – 60	61 – 70	> 71
Investigated (TachoComb)	116	29	87	17 – 74	8	28	44	22	12	2
Control	74	60	14	24 – 68	0	28	17	15	17	0
Total	190	89	101	17 – 74	8	56	61	37	29	2

The teeth were removed because of dental active foci or suspicions of latent foci. In 102 (53.7%) cases, the reasons for extraction were teeth in the course of pulp gangrene; in 28(14.8 %) cases – acute purulent pulpitis. In 49 (25.7%) patients, teeth were extracted because of the chronic inflammation of the periapical tissue and in 11 (5.8%) patients – because of the difficulties with the wisdom tooth eruption. Altogether, 245 teeth were extracted.

The patients qualifying for tooth extraction were subdivided into two groups. The group under study consisted of 116 people, whose oral anti-coagulant dosage schemes were not changed before and after the extraction and in whom the International Normalized Ratio (INR) ranged from 2.2 to 4.1. The INR values were as follows: from 2.1 to 2.5 in 32 patients; from 2.6 to 3.0 in 46 patients; from 3.1 to 3.5 in 29 patients; from 3.6 to 4.0 in 4 patients; it was greater than 4.1 in 3 patients.

The control group comprised 74 patients, in whom oral anti-coagulants were discontinued 3 days prior to the tooth extraction, and then reassumed after the extraction, on the day of the extractive surgery. The IRN values in this patient group were < 2.0 and ranged from 0.95 to1.97. These patients' teeth were extracted under local anesthesia (2% lignocaine hydrochloride) and special attention was paid to the application of a non-traumatizing surgical technique so as not to crush the tissues surrounding the alveolus (gingival and paradental tissues, alveolar bone). In the investigated group, the post-extraction wounds were treated with the TachoComb formula made by the Hafslund Nycomed Company, in the way described in a previous publication [11]. In the control group the wounds were sutured and the pressure with a gauze pad was used. The subdivision of the patients into groups is presented in Table 2.

Table 2. Anticoagulants received by the patients who have undergone valve implantation

Group	Number of patients	Treatment procedure	
		Local	Oral anticoagulants
Investigated	116	TachoComb formula	Not discontinued
Control	74	Suturae alveoli, pressure	Discontinued

Alveoli were cleared of granulation. Post-extraction wounds were filled up with the TachoComb hemostatic surgical dressing, which is a combination of fibrinous adhesive and collagen. If necessary, in the cases of medium or high degree of difficulty, surgical sutures were applied to the wounds. After the extractive surgery, the patients were administered Paracetamol, Acenol or Tramadoll. Soft-consistency diet was recommended to the patients. Also, they were instructed as to the need for maintaining appropriate hygiene of the mouth cavity and a more relaxed lifestyle. The patients came back for check-ups on the 2nd, 4th, and 6th day after following the extraction.

The efficacy of the treatment and bleeding control was evaluated in percent and was assessed according to the following criteria: occurrence of secondary bleedings after the first dressing of the post-extraction wound, degree of the bleeding intensity and the day when it occurred, length of the haemostasis period. The degree of the bleeding intensity was referred to as slight (1st degree), medium (2nd degree), or intense (3rd degree). In the case of the 1st degree bleeding, slight oozing from the alveolus occurred, which usually stopped by itself or after pressure was applied. The 2nd degree bleeding occurred when the clot grew significantly larger while the bleeding additionally required another local dressing of the post-extraction wound. The cases of repeated bleeding, which required repeated treatment of the post-extraction wound were considered as 3rd degree bleeding cases.

The length of the haemostasis period, i.e. the clot formation time, was measured from the moment when the hemostatic material was placed in the alveolus, or the post-extraction wound was sutured, to the moment of complete arrest of bleeding and appearance of the clot in the alveolus.

RESULTS

The incidence of secondary bleedings in the investigated patient group, i.e. those receiving prophylactic oral anticoagulants, in whom 245 teeth were extracted over the period of nearly ten years, is presented in Table 3. Secondary bleeding occurred in 13 (i.e. 6.8%) out of 190 patients treated during the aforesaid period. In the investigated group, bleeding was found only in 3 (2.6%) persons. Local treatment of the post-extraction wounds with the TachoComb fibrinous-collagenous adhesive was effective in 97.4% of the patients. In 113 out of 116 treated patients effective local haemostasis was achieved due to the application of the TachoComb formula, without interrupting the anti-thrombotic therapy under way. In the control group, secondary bleedings were found in 10 patients, i.e. 13.5%. The above observations confirm that the application of the TachoComb formula had a significant impact on obtaining stable haemostasis and prevented the intensification of secondary post-extraction bleeding in the investigated group. Despite the discontinuation of oral anticoagulants, secondary bleedings occurred more frequently in the control group than in the investigated group.

The medical history and the examinations of the control group patients suggested that the incidence of secondary bleedings was influenced by the following factors: non-observance of medical recommendations following the extractive surgery, i.e. non-solid or semi-liquid diet, appropriate hygiene of the mouth cavity; simultaneous application of the medications due to systemic diseases additionally affecting haemostasis and resulting in an interaction with oral anticoagulants; systemic diseases such as diabetes and arterial hypertension.

Table 3. Occurrence of secondary bleeding in 190 patients receiving oral anticoagulants

Secondary Bleeding	Treatment procedure		Total
	TachoComb (investigated group)	Suturae alveoli, pressure (control group)	
None	113 (97.4 %)	64 (86.5 %)	177 (93.2 %)
Found	3 (2.6 %)	10 (13.5 %)	13 (6.8 %)
Total	116 (100.0 %)	74 (100.0 %)	190 (100.0 %)

Table 4 contains the information on the time elapsed between the extraction and the moment when secondary bleeding occurred. In the investigated group, such bleedings were found in 2 patients on the third day after the extractive surgery, and in 1 patient on the fifth day, whereas in the control group secondary bleedings occurred in 7 patients as early as on the second day after the extraction, and in 3 patients – on the third day.

Table 4. The day of the secondary bleeding occurrence

Group	Number of patients	Secondary bleeding	Day on which bleeding occurred				
			First	Second	Third	Fourth	Fifth
Investigared (TachoComb)	116	3 (2.6 %)			2		1
Control	24	10 (13.5%)		7	3		

The intensity and the degree of the secondary bleedings, including the INR values related to the given case, are shown in Table 5. The data suggest that only light bleedings, characterized by slight oozing from under the clot, were found in the group of the patients treated with the TachoComb hemostatic dressing. Secondary bleeding was found in the patients whose INR values ranged from 2.6 to 3.0.

In the control group, after the discontinuation of oral anticoagulants, 3 patients developed slight secondary bleeding, 6 – medium and 1 – intense degree bleeding. In 6 cases, bleeding occurred when the INR values were low, i.e. from 0.9 to 1.5. In 3 patients, bleeding was found at the INR ranging from 1.6 to 2.0, whereas in 1 patient bleeding occurred at INR = 2.3. These data are presented in Table 5.

Table 5. Occurrence of secondary bleeding in the investigated and control groups, in consideration of the bleeding Intensity and INR level

Patient Group	Number of patients	Secondary bleeding	Bleeding intensity			International Normalized Ratio (INR) Level				
			Sight	Medium	Intense	0.9-1.5	1.6-2.0	2.1-2.5	2.6-3.0	3.1-3.5
Investigated (TachoComb)	116	3 - 2.6 %	3	0	0	0	0	0	3	0
Control	74	10 - 13.5%	3	6	1	6	3	1	0	0

The application of the TachoComb tissue adhesive as a local dressing to dental post-extraction wounds in 190 patients receiving oral anticoagulants had a positive influence on the length of haemostasis and the clot formation time. The data in Table 6 demonstrate that the average haemostasis time in these patients was 191.6 s (109 – 298), which was shorter than in the control group (312.1 s).

Table 6. Hemostasis time in 190 patients receiving anticoagulants, depending on the local treatment

Local Treatment Type	Number of patients	Average	Minimum	Maximum
TachComb	116	191.7	109.0	298.0
Suturae alveoli, pressure	74	312.1	137.0	456.0
Total	190	224.9	104.0	456.0

DISCUSSION

The surgical stomatological treatment of patients undergoing prolonged anti-thrombotic pharmacotherapy is connected with the choice of both an adequate preparatory procedure preceding tooth extraction and an appropriate local dressing following the extraction. The absence of any uniform code of practice in that respect remains a topical issue in stomatology [1, 2, 6, 8, 9, 12, 17]. The author's own observations [11, 12] on the post-extraction procedures in the patients taking prophylactic oral anticoagulants, conducted over a period of nearly ten years, justify the adopted course of treatment consisting in the careful and thorough application of local dressing to the wound following tooth extraction using the TechoComb formula, without interrupting the anti-thrombotic therapy. Local homeostatic formulas available nowadays, i.e. fibrinous tissue adhesives (Teesucol, Beriplast), including the TachoComb fibrinous-collagenous formula used in this study, have proved to be highly effective in obtaining normal haemostasis [4-6, 9-11, 13, 20]. Secondary bleeding occurred in 3 patients receiving the TachoComb formula which amounted to 2.6 %. In the patients whose post-extraction wounds were treated only with compression, the bleeding occurred in 10 patients, which accounted for 13.5 %. The authors' own observations and findings are analogous to the data presented by Blinder et all [2, 3], who observed post-extraction bleedings in 8.6% of 150 patients receiving anticoagulants, in whom he had administered tooth extraction. Numerous authors have stressed the significance of local treatment in the prevention and the treatment of post-extraction bleedings in patients undergoing anti-thrombotic therapy [6-8, 12, 15, 20]. Benoit, Carter, Evans, Gaspar are of the opinion that in such cases there is no need for interrupting the anti-thrombotic therapy, provided an appropriate local dressing of the post-extraction wound is administered [4, 6, 7, 9]. Blinder et all [2], using various types of local treatment

i.e. an absorbable gelatin sponge and surgical sutures; tissue adhesive, an absorbable gelatin sponge and suturing of the wound; an absorbable gelatin sponge, surgical sutures combined with of the oral rinse of tranexamic acid, were able to obtain satisfying results after treating 117 post-extraction wounds without interrupting the anti-thrombotic therapy.

The authors' own research has proved the INR within the therapeutic limits not affecting the intensity of secondary bleeding in the investigated group. Three cases of secondary bleeding were observed following the application of the Tacho-Comb formula, within the INR value between 2.5-3.5. The observations regarding the relationship between the INR value and the occurrence of secondary bleeding are in accordance with the observations made by other authors [3, 18, 19]. The INR value within the therapeutic limits did not affect either the number or the intensity of secondary bleedings.

In the light of the author's own observations and the literature on the subject, tooth extraction in the patients on oral anticoagulants without the change of their administration or the discontinuation of the treatment for the time of the extraction, seems to be a safe and recommendable procedure. An atraumatic local treatment and the use of local haemostatics facilitate the therapy. The good results obtained following the use of the TechoComb formula lead to the conclusion that tissue adhesive haemostatics ought to be applied to the patients on oral anticoagulants, as, based on own and other authors' research, they are able to effectively ensure local haemostasis without the necessity for interrupting an anti-thrombotic therapy. Some authors [9, 16] recommend the local application of tranexamic acid in the form of oral rinse in addition to local haemostatics and surgical sutures. On the basis of the author's own research and clinical observations conducted by the author the following conclusions may be drawn:

CONCLUSIONS

1. In the group under study, where the TachoComb formula was used, secondary bleedings occurred in 3 patients (2.6%), whereas in the control group – in 10 patients (13.5%).
2. Due to the application of the TachoComb fibrinous-collagenous dressing, effective haemostasis was obtained without stopping the anti-thrombotic therapy before or after tooth extractions in 97.4% of the patients undergoing a prolonged treatment with oral anticoagulants.
3. The results of the studies prove the possibility of conducting dental extractive surgeries (tooth extractions) in patients receiving prolonged treatment with oral anticoagulants without the necessity for interrupting their anti-thrombotic therapy.

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SUMMARY

The use of oral anticoagulant medications causes prolonged bleeding after tooth extractions. The problem of local procedures aimed at obtaining normal haemostasis in such patients following tooth extraction still remains an important problem of stomatological practice. The objective of this paper is to evaluate the applicability of the TachoComb hemostatic formula to the local treatment of post-extraction bleeding in patients receiving oral anticoagulants. The TachoComb fibrinous-collagenous haemostatic formula was applied after tooth extraction to 116 patients receiving oral anticoagulants. The control group consisted of 74 patients in whom an anti-thrombotic therapy was discontinued before and during the extractive surgery and whose post-extraction wounds were sutured with compression. Secondary bleeding occurred in 3 patients (2.6%) from the investigated group and in 10 patients (13.5%) from the control group. Local application of the TachoComb formula resulted in obtaining effective haemostasis in 97.4% of the patients. In this group bleeding was reduced in intensity and occurred between the third and fifth day following the extraction. The observations made point out that the TachoComb may be used effectively for the local treatment of bleedings after tooth extraction in patients receiving oral anticoagulants.

Keywords: anticoagulant therapy, tooth extraction, hemostatic surgical dressing, bleeding

STRESZCZENIE

Stosowanie doustnych leków przeciwzakrzepowych powoduje powstawanie długotrwałego krwawienia po ekstrakcji zębów. Stosowanie miejscowych procedur zmierzających do uzyskania prawidłowej hemostazy u pacjentów po ekstrakcji zęba jest nadal ważnym problemem praktyki stomatologicznej. Celem niniejszej pracy jest ocena hemostatycznego preparatu fibrynowo-kolagenowy TachoComb zastosowanego do miejscowego leczenia krwawienia po ekstrakcji zębów u pacjentów, którzy przyjmują doustne leki przeciwzakrzepowe. Preparat zastosowano po ekstrakcji zębów u 116 pacjentów otrzymujących doustne leki przeciwzakrzepowe. Grupę kontrolną stanowiło 74 chorych, u których leczenie przeciwzakrzepowe przerwano przed i w trakcie leczenia chirurgicznego, a rany poekstrakcyjne były zaszywane z kompresją. Wtórne krwawienia wystąpiły u 3 osób z grupy badanej (2,6%) i u 10 osób z grupy kontrolnej (13,5%). Miejscowe stosowanie preparatu TachoComb pozwoliło na uzyskanie skutecznej hemostazy u 97,4% pacjentów. W tej grupie intensywność krwawienia zmniejszyła się i pojawiło się pomiędzy trzecim i piątym dniem po ekstrakcji. Wskazuje to, że preparat TachoComb można skutecznie stosować do miejscowego leczenia krwawień po ekstrakcjach zębów u pacjentów, którzy leczeni są doustnymi lekami przeciwzakrzepowymi.

Słowa kluczowe: terapia przeciwzakrzepowa, ekstrakcja zęba, hemostatyczny opatrunek chirurgiczny, krwawienie