HAEMOSTASIS CONTROL IN DENTAL EXTRACTION WITH CALCIUM SULPHATE: A CASE SERIES

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Dental treatment performed in patients receiving continuous oral anticoagulant drug therapy is becoming increasingly common in dental offices. For these patients it is imperative to carry out careful anamnesis, as well as a multi professional clinical evaluation with regard to the risk and control of hemorrhagic or thromboembolic episodes. The aim of this study was to assess the haemostatic efficacy and safety of the topical use of Calcium sulfate (CaS) in the setting of dental surgery. Following the approval from of the Local Research Ethics Committee (CaS) as a haemostatic agent in Dentistry. No patient had wound infection and the healing process appeared to be normal. CaS is useful for the local hemostasis and wound healing in periodontal surgeries. In conclusion, the use of CaS controlled the bleeding from inside the extraction socket producing instantly a very good haemostasis.

The dentist today is seeing increased numbers of patients with chronic medical illnesses. Among these patients are those that are being treated with anticoagulant drugs or antiplatelet agents to prevent venous or arterial thrombosis. Therefore the likelihood of anticoagulant-treated patients requiring oral surgery is significant and increasing. The coumarin compounds are used world-wide to provide anticoagulation. In Europe, warfarin (warfarin sodium and panwarfarin) is the most commonly used oral anticoagulant. Anticoagulants present management problems in oral surgery mainly because of prolonged intra-operative and postoperative bleeding. However, about 90% of post-extraction hemorrhage is from other causes, including the following (1):

• Excessive operative trauma, particularly to oral soft tissues;
• Poor compliance with postoperative instructions;
• Interference with the extraction socket or operation site (eg, by sucking and tongue pushing; plasminogen activators are present in saliva and oral mucosa and can thus cause fibrinolysis);
• Inflammation at the extraction or operation site, with resultant fibrinolysis;
• Inappropriate use of analgesia with aspirin or other nonsteroidal antiinflammatory drugs, which, by interfering with platelet function, induce a bleeding tendency;
• Uncontrolled hypertension;

Many clinicians have recommended interruption of continuous anticoagulant therapy for dental surgery to prevent hemorrhage. However, with review of the available literature, no well-documented cases of serious bleeding problems from dental surgery in patients receiving therapeutic levels of continuous warfarin sodium therapy were identified, but several documented cases were found of serious embolic complications in patients whose warfarin therapy was withdrawn for dental treatment (2). Fundamentally, the surgeon and treating clinicians must balance the need for reducing anticoagulant therapy and preventing undue hemorrhage against the associated increased risk from the diminution of the therapeutic benefit of anticoagulation therapy resulting in potentially

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life-threatening thromboembolism (3). A recent survey
showed that of more than 950 patients receiving
continuous anticoagulant therapy (including many
whose anticoagulation levels were well above currently
recommended therapeutic levels) who underwent more
than 2400 surgical procedures, only 12 (1.3%) needed
more than local measures to control hemorrhage (4). The
recommendations concerning treatment emphasis, timing,
and modifications of anticoagulant intake in relation to
oral surgery have been controversial, and therefore it is
important to have local validity hemostatic agents. One of
the more common methods of intra-operative hemorrhage
control involves the use of a topical hemostatic agent.
A major concern in the management of dental patients
taking antithrombotic agents is the potential for excessive
bleeding after invasive dental procedures. It has been
reported that some of these agents, such as bone wax and
ferric sulphate, may produce an inflammatory response if
left in situ (5, 6). It has also been reported that the use of
hemostatic collagen, cellulose and vasoconstrictors for
local haemorrhage control in endodontic surgery may
produce a systemic-vascular response (7-9). Aim of the
present paper was to describe a new approach for the
control of hemostasis during dental extractions with the
use of Calcium Sulphate (CaS).

MATERIALS AND METHODS

Ten teeth (8 mandibular teeth, 2 maxillary teeth) in 10
healthy patients (6 women and 4 men) with a mean age of 44.6
years (±13.2 years) were included in the study. The protocol
of the study was approved by the Ethics Committee of the
University of Chieti-Pescara. A total of 10 patients who were
kept on warfarin as a maintenance dose for >1 year with INR
>3.0 and required dental extractions were recruited for this
study. Patients with history of chronic renal or liver disease
or who were on drugs that could affect liver function or
haemostasis, other than warfarin, were excluded. All patients
were physically healthy, with underlying systemic disease as
determined by medical history screening and with at least one
tooth to be extracted. Before entering the study, patients were
informed about the nature of the investigation, and signed an
informed consent form. All patients received basic periodontal
treatment and exhibited good oral hygiene. Informed consent
was obtained from all participants who met the study criteria
and they were randomized into two groups. Patients having
one tooth scheduled for extraction were assigned to test and
control groups at the time of their recruitment in the study. All
patients continued warfarin therapy. The test extraction socket
were filled with Calcium Sulphate in layers (P30, Chimas,
Casalecchio Di Reno, Bologna, Italy), a solution of Potassium
Chloride (4%) was used to buffer the surface of the mould, to
get a strengthening and hardening of the CaS itself, while was
used for wound closure for control group the gauze on the
extraction site for at least 30 minutes and change the gauze with
new at the end of their visit. Dental extraction was performed
under local anesthesia with using articaine with adrenaline
1:100.000 infiltrated in the sub periosteum. Local hygiene
treatment and antibiotics (amoxicillin + clavulanic acid, 1 gram
twice per day; Neo-Duplax, Procter & Gamble, Rome) were
added for 5 days, starting from 12 hours prior to surgery (10). All
patients were given detailed written postoperative instructions,
the contents of which were verbally illustrated by the treating
dentist. Patients were asked to wait for a minimum of one hour
within the clinic area; they were closely monitored for bleeding
status. All patients returned for postoperative follow-ups at days
1, 3, 5 and 7. The status of bleeding and healing were objectively
monitored by an independent examiner blinded to the treatment
protocol for the four treatment groups. Incomplete wound
closure or the absence of scar tissue formation was considered
poor healing (Fig. 1). The presence of a solid clot covering the
extraction socket (Fig. 2) was considered as no bleeding, while
the presence of a fresh clot that shed easily, or blood oozing
was considered as positive bleeding. The statistical analysis has
been carried out employing the Chi-square test according to the
Statistical Package for Social Science (SPSS 8.0). The value of
p <0.05 was considered as significant (11).

RESULTS

Healing pattern was found to be approximately similar in all
treatment groups, showing significant improvement at each consecutive visit. Bleeding at postoperative day 1
was significant, furthermore, the improvement continued
and was approximate at day 5 and almost eliminated by
the last visit (day 7). Bleeding at postoperative day 1 was
not present, in the extraction site was present a calcium
sulfate and a solid clot covering at 1 day. No a fresh clot
that shed easily, or blood oozing was present at day 3.
Cross-comparison among the two treatment groups did
show significant difference in healing at the different
postoperative visits.

Statistical analysis

A statistically significant difference in the adequate
hemostasis was present between control group I vs test
group II (calcium sulfate) (p-value = 0.0066).

DISCUSSION

A significant percentage of the population receives
anticoagulation therapy in the prevention and treatment of
thromboembolic disease states, such as deep vein
thrombosis, pulmonary embolism, cerebrovascular
disease, numerous cardiac disorders and the various
prothrombotic states (C.: lupus, factor S and factor C
deficiency) (12). Hemostatic failure is one of the most
serious problems encountered by the dental professionals.
It may cause excessive postoperative bleeding delay
in wound healing and increase risk of infection (13). Local haemostatic methods non-resorbable sutures,
(fibrin glues), antifibrinolytic agents (tranexamic acid in mouthwash form), replacement therapy (recombinant or plasma derived clotting factors, platelet-rich plasma) and desmopressin are the usual management (14, 15). In our series hemostasis was achieved in all of the twenty two patients. No patient had wound infection and the healing process appeared to be normal. It is not necessary to reduce oral anticoagulant therapy in patients undergoing routine dental extractions with using local hemostasis (16). Reducing anticoagulant therapy to prevent hemorrhage against the associated increased risk from the diminution of the therapeutic benefit of anticoagulation therapy results in potentially life-threatening thromboembolism (3). For this reason it is important to have a valid local hemostatic agent. The CaS was highly absorbent and was used for wound protection and for control of oozing or bleeding in endodontic surgery procedure and surgical-orthodontic treatment of impacted teeth. As for application, this product should be held in place for approximately 1 to 3 minutes to achieve hemostasis and left in situ. The CaS material is completely resorbed within 1 to 4 months (17). In addition to serving as a mechanical obstruction to bleeding, these materials affect the coagulation process.

The residual presence of the CaS in the bony cavity is
not problem. It is reasonable to think that the CaS reabsorsbs the blood proteins, therefore assuming a net negative charge. This resorption might start the intrinsic coagulation pathway (18). The resorption of Factor XII might in this case assume an important role in the biomaterial-induced clotting (19). As has been recently shown in vitro, contact between a biomaterial and blood determines the activation of Factor XII as well as precallicrein. Besides its influence on the clotting-mechanisms activation downfall, CaS used in the disinclination of impacted teeth carries out a haemostatic effect through a compressive effect, insulating the tooth like a rubber dam. Moreover, the white color of CaS greatly facilitates visibility of the surgical area to the surgeon. In the present study, CaS has been used with the aim of controlling bleeding in patients receiving oral anticoagulant. It is important to keep in mind that the biomaterial is totally resorbable and biocompatible, and, no problems should arise if some CaS particles are left in the extraction socket (20-22). In conclusion, the use of CaS controlled the bleeding from inside the extraction socket producing instantly a very good haemostasis. Further studies are desirable, in order to confirm the simplicity, possibilities and limits of the proposed procedure.

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