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Leading Clinical Paper

Trauma

Is thromboembolism prophylaxis necessary for low and moderate risk patients in maxillofacial trauma? A retrospective analysis

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Abstract. This study was designed to investigate retrospectively the incidence of venous thromboembolism (VTE) and the need for thromboembolism prophylaxis in patients undergoing surgery for oral and maxillofacial trauma. Data were obtained from all patients treated under general anaesthesia for maxillofacial trauma between January 2000 and January 2009 in the Department of Oral and Maxillofacial Surgery of the VU University Medical Center, Amsterdam. Patients' records were reviewed for complaints and information related to deep venous thrombosis (DVT) and pulmonary embolism (PE). The patients were classified according to a risk classification, and the incidence of reported DVT and PE was calculated. None of the patients received any form of thromboembolism prophylaxis. Of the 479 patients included in this study, one presented with VTE (0.2%). This male patient was treated for a panfacial trauma and was classified as high risk. From all analysed parameters only surgery time classification proved to have a significant relationship with VTE.

Keywords: maxillofacial trauma; thromboembolism; thromboembolism prophylaxis.

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Venous thromboembolism (VTE) comprises deep venous thrombosis (DVT) and pulmonary embolism (PE).[1,2] Several studies on general surgery patients have shown that the risk of developing DVT is less than 3% for patients under 40 years of age and in those who undergo surgery that lasts less than 30 min.[3,4] The incidence is also dependent on the type of surgery; ranging from 32 to 88% for urological, gynaecological or orthopaedic surgery.[5–8] In oral and maxillofacial surgery the incidence is 0.36–0.5%.[9]

The risk for VTE increases further with age, prolonged immobility, use of oral contraceptives and trauma.[3,4,8,10] In patients with multiple trauma, VTE is a major cause of morbidity and mortality.[11,12] In a prospective study, Geerts et al. evaluated 349 patients following major trauma using contrast venography. They found that 58% had a detectable DVT, 18% of which were proximal, putting the patients at high risk of embolization and progression to PE.[11,13,14] Two studies demonstrated that head injury is a high risk factor

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Table 1. Levels of thromboembolism risk in surgical patients without prophylaxis according to Geerts et al.[4]

Level of risk	DVT, % calf	DVT, % proximal	PE, % clinical	PE, % fatal
Low risk Minor surgery in patients <40 years with no additional risk factor	2	0.4	0.2	<0.01
Moderate risk Minor surgery in patients with additional risk factor Surgery in patients aged 40–60 years with no additional risk factors	10–20	2–4	1–2	0.1–0.4
High risk Surgery in patients >60 years, or age 40–60 years with additional risk factors (cancer, prior VTE)	20–40	4–8	2–4	0.4–1.0
Highest risk Surgery in patients with multiple risk factors (age >40 years, cancer, prior VTE)	40–80	10–20	4–10	0.2–5

for VTE and therefore prophylaxis is supposed to be necessary.[15,16] Recently Williams et al. reviewed the incidence of VTE in patients undergoing orthognathic and various types of reconstructive maxillofacial procedures.[17] Currently, there is no information available on the incidence and risk potentials of VTE in patients with maxillofacial trauma. The use of VTE prophylaxis in patients with maxillofacial trauma undergoing surgery has not received any attention.

The present study was designed to investigate retrospectively the incidence of VTE and the necessity for thromboembolism prophylaxis in patients undergoing surgery for oral and maxillofacial trauma.

Materials and methods

Patients treated under general anaesthetic for maxillofacial trauma between January 2000 and January 2009 were identified retrospectively. They were identified using the hospital database. Data concerning age, gender, medical history, nicotine usage, type and cause of trauma, concomitant injuries, type and duration of surgery were obtained. Medical records were searched for complaints of VTE (e.g. pain, swelling, redness of leg, haemoptoe, dyspnoea). Physician visits in the postoperative period, and medication use, apart from that used prior to surgery, were noted. According to the trauma protocol in use, all patients were seen weekly for at least 6 weeks. Further postoperative follow-up was performed at 3 and 6 months. All patients were classified according to the risk classification according to Geerts et al. (Table 1).[4] None of the patients received any thromboembolism prophylaxis perioperatively.

Patients with intensive care indications were not included in this study. These patients are classified as having the highest risk for VTE in the authors' institute and therefore require prophylaxis. Indications for admission to the Intensive Care Unit (ICU) at the authors' institute are formulated in medical protocols and are based on the guidelines of the The Netherlands' Scientific Society of Intensive Care Specialists.[18] These guidelines state that given the high incidence of VTE in ICU patients and the demonstrated effectiveness and safety of prophylaxis there is an indication for VTE prophylaxis for every ICU patient.[19]

The SPSS 14.0 package was used to determine the incidence of reported VTE. If possible a logistic regression analysis was performed, together with the odds ratios, the related 95% confidence intervals and significant risk factors ($p < 0.05$). If this was impossible, relationships between the risk factors, gender, age >40 years, type of surgery and surgery time classification and VTE were studied using Fishers' exact test (Table 2).

Table 2. Operation time classification.

Classification	Patients
<30 min	22
31–60 min	46
61–120 min	366
121–180 min	28
181 > min	17
Total	479

Results

The demographic data for patients according to the type of trauma are shown in Table 3. The study population comprised 479 patients (337 males; 142 females) with a mean age of 36.9 (standard deviation (SD) ± 16.3) years. Traffic accidents were the main cause of injury (187 patients) followed by violence related trauma (104 patients) and falls (81 patients). Other causes of injury were seen in 68 patients (sports related trauma in 43; suicide attempt in 2; work related trauma in 23). In 39 patients no cause of injury could be obtained.

In 134 patients a mild traumatic brain injury was diagnosed. Concomitant injuries were seen in 17 patients (3 with abdominal injuries, 11 with orthopaedic injuries, 3 with thoracic injuries). No patients were dependent on intubation or ventilation, preoperatively or postoperatively, as this is an indication for admittance to the ICU. All patients were treated in accordance with the institute protocol. This means that maxillofacial trauma was treated within 6 h in maxillofacial multitrauma or within 24 h in single maxillofacial trauma after presentation. No compression stockings were used for any patients, either as prophylaxis or therapy.

The mean operation time was 95.3 (SD ± 46.9) min and the mean hospital stay was 27.4 (SD ± 10.6) h. Table 4 lists

Table 3. Patients' demographic according to type of trauma.

Type of trauma	Patients Male/female	Age (years ± SD)	Operation time (min ± SD)	Hospital stay (h ± SD)
Mandibular fracture	134/62	33.3 ± 15.2	103.9 ± 27.8	24.0 ± 0.0
Zygomatic bone fracture	128/56	40.5 ± 16.3	70.0 ± 10.2	24.0 ± 0.0
Le Fort I/II/III	11/3	40.4 ± 20.0	99.3 ± 39.7	42.9 ± 23.4
Panfacial trauma	23/8	40.9 ± 15.3	210.4 ± 80.1	57.4 ± 13.4
Multitrauma	10/5	33.1 ± 13.1	112.7 ± 35.8	28.3 ± 8.5
Blow-out fracture	5/5	49.4 ± 29.4	60.0 ± 9.8	24.0 ± 0.0
Frontal sinus fracture	10/1	31.4 ± 14.4	150.0 ± 15.5	45.8 ± 7.3
Zygomatic arch fracture	16/2	31.4 ± 7.1	30.0 ± 5.2	24.0 ± 0.0