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# Impending asphyxia induced by anticoagulant therapy

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## Introduction

WHEN anticoagulant treatment is intensive or uncontrolled, thrombo-embolism occurs less commonly, but haemorrhagic complications are more frequent. Coon and Willis (1974) in a review of 3,862 courses of anticoagulation found a 6·8 per cent incidence of haemorrhage. The sources of bleeding most often encountered were genito-urinary, gastro-intestinal, soft-tissue wounds and epistaxis. The sublingual, pharyngeal and laryngeal tissues are among the sites of haemorrhage where the threat to life does not lie primarily in the blood loss. Bleeding into these areas has not infrequently been described in haemophiliacs but a search of the literature reveals only five cases resulting from anticoagulant therapy. Revussi *et al.* (1969) and Owens *et al.* (1975) each report a patient with a retropharyngeal haematoma. There are two instances of pharyngolaryngeal haemorrhage (Giroux *et al.*, 1967) and a single recorded case of bleeding into the sublingual space (Lepore, 1976). The drugs responsible were Warfarin Sodium, Synthrone and Marcoumar.

We describe here a case of upper airway obstruction due to spontaneous haemorrhage into the floor of the mouth, the pharynx and the larynx caused by the administration of Synthrone.

## Case report

Miss E.M., a 21-year-old pupil nurse, was admitted as an emergency to the Manchester Royal Infirmary at 1 a.m. on Monday, 21 November 1977. She has been complaining of a sore throat for nine days, and, during the weekend it had become so severe that she was unable to swallow her saliva. At this time she noticed several bruises on her left forearm for which she could not account. On the Sunday the patient had been intermittently hoarse and described a choking sensation when lying down. That evening a diffuse painful swelling appeared in the front of the neck and later, immediately prior to admission, she found that her lower denture was displaced. On removing it she felt a large mass in the floor of the mouth. At 4 a.m. on the 21 November a request for an E.N.T. opinion was made because the patient was experiencing difficulty in breathing which was relieved only by sitting up in bed.

### *Past medical history*

The patient underwent an appendicectomy at another hospital in 1974. This was followed by a deep vein thrombosis of the left calf muscle since which time she had been on continuous controlled anticoagulant therapy. In spite of this she suffered a further three deep vein thromboses at the same site in the ensuing two years. Her last attendance at the anticoagulant clinic was on the 4 November 1977 when it was found that the dosage of Synthrone was satisfactory. There had been no evidence of a bleeding tendency. The patient denied



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any allergies or ingestion of other tablets apart from 2 tablets of Codeine on the day before admission.

*On examination*

The patient was a plump young lady who was fully conscious and orientated but somewhat agitated. She was in moderate respiratory distress which became worse on assuming a supine posture. There was no cyanosis.

Vital signs:—Temperature 37°C, pulse 120/min., B.P. 160/80. Four large ecchymoses were noted on the left forearm and a smaller one on the right hand. Inspection and palpation of the neck showed a large, firm, tender swelling between the symphysis menti and the hyoid bone. There was some degree of trismus. The whole of the floor of the mouth was occupied by a hard plum-coloured swelling which was pushing the tongue upwards and backwards. On depression of the tongue only the soft palate could be visualized. Indirect laryngoscopy proved impossible. The nose and ears were normal. No lymph nodes were palpable in the neck and the chest was clear.

*Diagnosis*

A diagnosis of spontaneous haemorrhage into the floor of the mouth was made. This was thought to be due to the anticoagulant therapy.

*Investigations*

6 a.m. 21 November:—

Haemoglobin 14·2 G per cent.
WBC 20,000
Platelets—normal
Prothrombin time—greater than 3 minutes.
—control 14 seconds
Thrombotest—10 mins. (The expected safe range for a patient taking anticoagulants is between 84-158 seconds).
Chest X-ray—normal

*Initital treatment*

*6.30 a.m.* Anticoagulants were discontinued.

The patient was given Vitamin $K_1$ 10 mg. intravenously and 10 mg. intramuscularly. Oxygen was administered.

*Progress*

*9.00 a.m.* The patient's condition had not stabilized. The Prothrombin time was now 54 seconds. The haematologist was consulted and the patient was taken to the operating theatre where she received 1,000 units of Prothromplex.

*9.30 a.m.* Prothrombin time 16 seconds.

*9.45 a.m.* The patient was operated upon and a sublingual incision with aspiration of the floor of the mouth showed absence of any discrete collection of blood clot. A tracheostomy was performed under local anaesthesia with the patient in a semirecumbent position on the operating table. A cuffed portex tube was inserted. The patient was given Depomedrone 40 mg. i.m. and commenced on a course of Ampicillin 500 mg. 6-hourly i.m.

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A direct examination of the oropharynx, hypopharynx and larynx was performed under general anaesthesia on the following day, when it was found that the sublingual extravasation of haematoma had lessened during the previous 24 hours. The tongue could be depressed and a Boyle-Davies gag inserted with ease.

Further extravasation had given rise to a deep purple discolouration of the tissues involving both pillars of the fauces bilaterally, extending down the lateral pharyngeal walls. The most prominent feature of the hypopharyngeal region was the gross oedema and bruising of the arytenoids. The epiglottis and false cords were swollen and discoloured, but the true vocal cords were normal in appearance.

*Further progress*

The rest of the patient's stay in hospital was uneventful, and it was possible to cork off the tracheostome ten days post-operatively without any ill effects. After a further six days, the tracheostome closed spontaneously and the patient left hospital in mid-December.

*Out-patient review*

It was decided by the haematologists that administration of Synthrone should be stopped, and that any further deep venous thromboses could be managed by the administration of Heparin.

By the middle of August, 1978, the patient was working full-time at her nursing duties.

The circumference of her left leg was greater than that of the right leg both above and below the knee, but this was regarded as part of the inevitable post-phlebitic syndrome.

The patient returned home to Ireland at the end of August, 1978, in good health.

## Discussion

It is proposed to discuss the aetiology, patho-physiology, anatomy and treatment of haemorrhage into the tissues surrounding the upper alimentary and respiratory tracts in patients with a coagulation defect. Appropriate reference will be made to the case described above.

## Aetiology

In any coagulopathy, bleeding in the regions of the oral cavity or laryngo-pharynx may be caused by minimal stimuli which only a careful enquiry and local examination will elicit.

In the mouth, haemorrhage may result from obvious trauma particularly external injury to the jaws, dental manipulations, vigorous brushing of the teeth, especially in the presence of gingivitis, and biting of the tongue. In the last situation the bleeding, once it has started, will be further encouraged by the almost incessant muscular movement of the tongue and floor of the mouth (Perella and Costa, 1954).

Trauma to the pharynx and larynx, however, may be less easily recognized. Bleeding in these sites can be caused by excessive vocal abuse, as in crying

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(Pochedly and Rosales, 1968) and shouting (Fox *et al.*, 1946), by sneezing or coughing (Owens *et al.*, 1975) and by the habit of 'hawking' (Colman, 1956). An additional factor in the onset and perpetuation of haemorrhage in these circumstances is the rise in venous pressure which accompanies such forceful manoeuvres.

The most common definable cause of bleeding around the upper respiratory tract in patients with a coagulopathy is probably local infection where vasodilatation undoubtedly contributes to the initiation of the haemorrhage. It should be mentioned that the symptoms of soreness and pain in the pharynx and larynx may be due not only to the infective process but also to the submucosal haemorrhage itself.

Finally, in some cases the bleeding may not result from any specific stimulus and can therefore be considered to be truly spontaneous.

## Pathology

Haemostasis is dependant upon adequate activity of plasma coagulation factors, normal function of a sufficient number of platelets, and vascular integrity. Therefore, although it may be assumed that it is the depression in clotting factor activity which is responsible for haemorrhage in a patient receiving anticoagulants, the possibility of a platelet or vascular deficiency must not be overlooked.

The effect of anticoagulation is usually monitored by estimation of the prothrombin time which should be kept at two and a half times the 'control' time which is equal to 14 seconds. The normal therapeutic anticoagulant-induced prothrombin activity is 5-10 per cent.

Because oral anticoagulants differ in their rate of absorption and in their peak and duration of effect, adequate anticoagulation may be difficult to maintain. It is important to remember that anticoagulants can be potentiated by deficiencies of Vitamin $K_1$ or dietary fat, by hepatic or renal disease, and by drug interaction. In the case of Synthrone these drugs are Atromid, Phenylbutazone, Quinidine, Salicylates, Thyroxine and excess ethyl alcohol intake.

## Anatomical features

The larynx may be the primary site of haemorrhage but it can also become involved by the dependant extravasation of blood from the tongue, floor of mouth, and the peritonsillar and retropharyngeal areas along the fascial planes of the neck. This is well exemplified by a case of asphyxia following dental extraction in a haemophiliac which was described by Endicott *et al.* (1942). At necropsy it was found that there had been massive infiltration of the cervical tissues with blood extending from the floor of the mouth downwards through the base of the tongue in the plane above and behind the mylohyoid muscles, hyoid bone and thyro-hyoid membrane. The blood so contained by this musculomembranous layer thus reached the submucous tissues of the aryepiglottic region, larynx and upper trachea. This anatomical pathway prompted Lepore (1976) to describe a case of sublingual haematoma with respiratory obstruction as exhibiting a 'pseudo-Ludwig' phenomenon. Lepore makes the clinical observation that if the tongue can be sufficiently depressed to allow visualization of the faucal pillars, only the sublingual space is occupied by the haematoma.

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However, should the submandibular space also be involved, then the fauces cannot be seen. This, one surmizes, is due to the haemorrhage having a splinting effect on the mylohyoid muscle, thus rendering it immobile and preventing depression of the tongue.

## Treatment

It is of paramount importance to establish control of the patient's coagulopathy as soon as possible. This will prevent further haemorrhage and compromise of the airway and will serve to reduce excessive bleeding during a subsequent surgical procedure to overcome the respiratory obstruction.

In the case of a patient receiving treatment with a Coumarin derivative, reversal of anticoagulation by cessation of anticoagulant therapy usually takes about 72 hours. Normal values for clotting time can, however, be achieved within 24 hours by the injection of Vitamin $K_1$. Because our patient was experiencing respiratory distress and was about to undergo a tracheostomy, a more rapid reversal of the anticoagulated state was required, and for this purpose Prothromplex was used. Prothromplex is an intravenous preparation containing a concentrate of the plasma-clotting factors which the anticoagulant therapy has reduced. In addition, hydrocortisone was administered parenterally to counteract existing oedema and to minimize its further formation.

Bactericidal antibiotic therapy is advocated in cases of pre-existing infection and in patients requiring operative intervention.

The efficacy of incision and drainage of what has been described as a sublingual haematoma is doubtful. Baird and Fox (1943) from a review of the literature cite three cases of haemophilia with haemorrhage into the floor of the mouth where local incisions were part of the treatment. They do not indicate what was found at these operations. A further case was reported by MacDonald *et al.* (1953) in which a vertical submental incision was made. The base of the tongue and both submandibular triangles were explored but no clot or localized collection of blood was discovered. Endicott *et al.* (1942) in their necropsy report state that there had been a massive interstitial extravasation of blood.

In the absence of trauma, bleeding due to a coagulopathy seems unlikely to produce a discrete haematoma, and incision for an interstitial haemorrhage is detrimental, resulting as it may in further bleeding. Such was the case in our own patient.

Once measures have been taken to stabilize coagulation, consideration must be given to relief of the upper airway obstruction. MacDonald *et al.* (1953) and Boyd (1950) advocate that an attempt be made at intubation of the trachea before resort is made to tracheostomy. This is an admirable suggestion should the degree of urgency not be too extreme but serious difficulties may be encountered during introduction of the tube. First, recumbency and head extension of the patient, prerequisites for an uncomplicated intubation, may exacerbate the airway obstruction; secondly, the haemorrhage can cause not only limitation of the space between the base of the tongue, epiglottis and pharyngeal walls but also narrowing and distortion of the larynx. Such deformities of the upper airway may preclude endo-tracheal intubation even under direct vision using a fibreoptic laryngoscope.

Kiviranta (1967) feels that introduction of an anaesthetic tube can scarcely be considered less dangerous than tracheostomy, since the trauma caused by

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introducing it may produce further haematoma formation in the larynx or bleeding from the mucosal surface. This is a definite hazard in so-called blind intubation.

In the case that we have described an experienced anaesthetist considered that safe intubation was virtually impossible. It was therefore decided to perform a tracheostomy under local anaesthetic with the patient in a semi-recumbent position and without the head extended. Understandably this was not a simple procedure.

**Summary**

A case is presented of spontaneous haemorrhage into the floor of the mouth occurring in a patient receiving anticoagulants. Spread of interstitial haematoma to the submucosal tissues of the pharynx and larynx caused respiratory embarrassment necessitating a tracheostomy. The genesis and management of such a problem are discussed, and it can be appreciated that close co-operation between the otolaryngologist, haematologist and anaesthetist is essential.

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