days. Stopping glyceryl trinitrate did not result in any further fall in osmolality.

Comment

Enoximone is a phosphodiesterase 3 inhibitor that has beneficial effects on low cardiac output.[1] The formulation we used (Perfan, Merrell Dow) contains propylene glycol 41·3% wt/vol. Propylene glycol is present in many drug preparations but rarely causes harmful effects. Adverse systemic accumulation has, however, been reported with topical silver sulphadiazine,[2] intravenous glyceryl trinitrate,[3] and multivitamin preparations.[4] Toxicity caused by propylene glycol may be manifested by hyperosmolality, lactic acidosis, haemolysis and haemoglobinuria, skin irritation, and deafness and other neurological disturbances. As propylene glycol distributes into both intracellular and extracellular compartments the hyperosmolar state associated with it is well tolerated.

We did not directly measure propylene glycol concentrations in our patient, but estimation based on the osmolal gap[2,4,5] (the difference between calculated osmolality and measured osmolality) gave a value of about 10 g/l, which has been associated with toxicity in previous reports but did not adversely affect our patient.

After the enoximone infusion was stopped the osmolality fell gradually towards normal values, consistent with an elimination half life of 41 hours. This exceeds the mean half life of five hours quoted for adults[3] and 16·9 hours for neonates[2] and may have been influenced by the continued administration of some propylene glycol with the glyceryl trinitrate. Up to 45% of propylene glycol is excreted in the urine, and poor renal function has an important effect on the accumulation of propylene glycol and the osmolal gap.[3] Impaired renal function, indicated by reduced elimination of gentamicin, may have contributed to the accumulation seen here.

As infusion of enoximone at a maximum dose delivers more propylene glycol to the patient than other drug infusions containing this compound the risk of adverse effects may be correspondingly greater with enoximone. As renal impairment often accompanies cardiac failure and may promote the accumulation of propylene glycol we recommend that particular care should be taken to use the minimum effective dose of enoximone, especially in infants. Estimations of serum electrolyte and urea concentrations and osmolality permit calculation of the osmolal gap, changes in which may be used as a non-specific indicator of changes in plasma concentrations of propylene glycol.

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Use of histoacryl tissue adhesive to manage an avulsed tooth

M J McCabe

Accident and Emergency Department, Northwick Park Hospital, Middlesex HA1 3UJ
M J McCabe, FRCSED, *registrar*

Correspondence to:
Accident and Emergency Department, Cardiff Royal Infirmary, Cardiff CF2 1SZ.

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Avulsed teeth are not uncommon and may occur in sport, assaults, and domestic violence. Successful reimplantation of an avulsed tooth depends on its rapid reinsertion into the socket and on maintaining its position by splinting before definitive treatment. Many patients present to accident and emergency departments rather than to their dental practitioners, especially at nights and weekends.[1] A simple splinting technique that can be used by senior house officers in accident departments is needed.

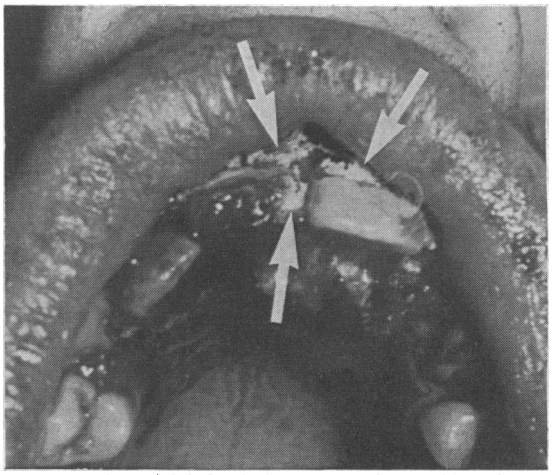
Case report

A 20 year old man presented to the accident department within 30 minutes of receiving a blow to the mouth with a hockey stick. The upper left first incisor had been avulsed and the upper left second incisor and upper right first incisor had fractured at the level of the gum. There were no fractures of the facial bones or dental fragments in the lips. The adjacent teeth were fractured at gum level so metal foil could not be used to splint the avulsed tooth and an alternative method was needed.

The tooth was replaced into the socket and maintained in position by applying histoacryl tissue adhesive (Cyanamid) from the enamel to the gingiva (figure). The adhesive was not allowed to encroach into the socket. A course of ampicillin was prescribed and a tetanus toxoid booster given. The patient was reviewed by his local dental practitioner two days later: the reimplanted tooth had not loosened, and root treatment was performed. Review at six months showed apical resorption, but the patient was asymptomatic. The root of the upper right first incisor had to be extracted.

Comment

Histoacryl tissue adhesive has been used successfully for a variety of purposes, including closing skin lacerations[2] and securing skin grafts. It is biodegradable but remains until the wound has healed well; it is also non-toxic to epithelial tissues.[2] After an avulsed tooth has been reinserted into the socket it must be adequately splinted[3]; metal foil splints, composite and orthodontic wire, suturing, and vacuum formed splints can be used.[4] Each technique has advantages and problems.[4,5]



Reimplanted upper left first incisor; arrows show position of tissue adhesive

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Histoacryl tissue adhesive has potential as a splinting material for avulsed teeth. It is particularly useful when there are no adjacent teeth or, as in this case, when the adjacent teeth have been fractured at the level of the gum and are not available for splinting. Contact of the adhesive with periodontal membranes must be avoided. Reimplantation can be done by junior staff fairly easily, thus avoiding delay, especially in accident departments where there are no dental staff on site. A prospective study is needed to evaluate the long term effects of the adhesive as a dental splint in an emergency.

I thank Mr T P Welch for permission to report this case, the photography unit at the Clinical Research Centre for its help, and the patient's dentist for allowing me to follow up the patient's progress.

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Two patients with eosinophilia myalgia syndrome associated with tryptophan

Lucas Georges M M van Garsse,
Peter Paul H Boeykens

Stedelijk Ziekenhuis, 9330 Dendermonde, Belgium
Lucas Georges M M van Garsse, MD, *chief physician*
Peter Paul H Boeykens, MD, *adjunct*

Correspondence to: Dr van Garsse.

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On 11 November 1989, after reports of cases of a so called eosinophilia myalgia syndrome, the Food and Drug Administration advised stopping the use of preparations containing tryptophan.[1] A virtually unequivocal epidemiological relation had been found between the use of tablets containing tryptophan and this syndome,[1-4] which is characterised by an intense eosinophilia and myalgia. Arthralgia, swelling of the extremities, rash, fever, cough, interstitial lung disease, arryhthmias, ascending polyneuropathy, and sclerodermiform skin thickening have also been described.[4]

As no cases of the syndrome have yet been reported in Europe the question arises of whether the syndrome can possibly be explained by contaminants in the American preparations.[5] However, we report on two patients with an eosinophilia myalgia syndrome for whom the tryptophan seemed not to have been supplied by an American pharmaceutical company.

Case reports

Case 1—A 28 year old woman with a history of hyperventilation started taking tryptophan 500 mg thrice daily at the end of August. At the beginning of December she experienced muscle rigidity and pain in her arms and legs as well as pruritus in the shoulders, and tryptophan was stopped in mid-December. The muscular pains got worse and the patient was given phenylbutazone 200 mg daily from 23 December. She also complained of a flush on her arms and legs. On 27 December the clinical examination showed no abnormalities other than pain on palpation of the muscles and a minor spotty erythema on the legs. Results of blood tests are shown in the table. In January 1989 the results of a blood cell count and cell smear had been normal. The erythrocyte sedimentation rate was normal (8 mm/h). Creatine kinase activity was normal. Tests for rheumatoid factors yielded negative results, and concentrations of complement and immunoglobulins, including IgE were normal. Results of the antinuclear antibody test in a titre of 160 showed a homogeneous pattern of fluorescence and results of lupus erythematosus and anti-DNA tests were negative. Lactate dehydrogenase activity was moderately increased with a raised third fraction. Results of other tests were normal. No parasites were found in the stool. A marrow aspiration showed a strikingly high number of eosinophils without other abnormalities. Ultrasonography of the upper abdomen showed no abnormalities; an electromyogram was normal; and chest *x* ray films were normal except for a slightly intensified interstitial pattern. Pulmonary function tests showed only a slight decrease in diffusion capacity. A skin and muscle biopsy showed discrete vasculitis in the subcutaneous tissue but no pathological changes in the muscle and fascia.

Case 2—A 60 year old woman with complaints of sleeplessness started taking tryptophan 1000 mg four times daily at the beginning of August. From the middle of December she experienced generalised muscle pain and stiffness and pruritus, cough, and an intermittent mild fever. She described a feeling of fatigue and had swelling of the extremities. At the beginning of February tryptophan was stopped. Results of a clinical examination at that time were normal except for a discrete oedema of the extremities and a diffuse muscular tenderness. Results of laboratory tests showed an important eosinophilia (table). The other results were normal except for increased activity of lactate dehydrogenase. Chest *x* ray films were normal, as were the results of ultrasonography of the abdomen and electromyography.

Characteristics of two patients with eosinophilia myalgia syndrome

	Case 1	Case 2
Dosage of tryptophan	500 mg thrice daily	1000 mg four times daily
Duration of intake	16 weeks	27 weeks
Leucocyte count at first visit*	$32{\cdot}5\times10^9$/l	$22{\cdot}5\times10^9$/l
% Of leucocytes:		
Neutrophils	38	52
Lymphocytes	13	12
Monocytes	2	1
Eosinophils	46	35
Bands (juvenile forms)		8
Metamyelocytes		3
Basophils	1	

*Normal range $4{\cdot}0$-$11{\cdot}0\times10^9$ cells/l.

Comment

Our patients had eosinophilia myalgia syndrome, which was related to the ingestion of tryptophan. Other causes of hypereosinophilia seem highly improbable. Thus eosinophilia myalgia syndrome is not a purely American disease.

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