CASE REPORT

Skin ulceration due to cement

S. M. ROBINSON & S. S. TACHAKRA
Central Middlesex Hospital NHS Trust, Acton Lane, London

SUMMARY

Despite legislation that requires manufacturers to inform the public about the dangers of contact with cement, severe ulceration from cement contact still occurs. We present a retrospective study of seven patients presenting to this department over a 2-year period. All were male and employed in the building trade, their injuries being sustained whilst at work. The injuries were to the lower limb, often multiple and required a median of seven visits before healing was complete. One required hospital admission and skin grafting.

INTRODUCTION

It has been known for many years that cement can cause skin problems including burns and ulceration (Rowe & Williams, 1963). In an attempt to protect cement users, both The Health and Safety Act (Section 6) of 1974 and The Consumer Protection Act of 1987 put forward legislation requiring manufacturers to display a warning notice on all cement products. In theory, cement workers should now be aware of the dangers. However, cement burns still occur.

It was our impression that those complaining of cement burns did not realize just how serious contact with cement could be. We report on seven cases presenting to this accident and emergency unit over a 2-year period, present a review of the literature and examine the adequacy of the present health warnings.

METHODS

A computer-assisted search was made for patients who had presented with cement burns over the 2-year period, May 1989–May 1991. Demographic data, clinical features, treatment and number of return visits to the department were recorded.
A survey was made of the information printed on bags of cement sold from DIY superstores and wholesale outlets warning of the dangers of contact with cement.

RESULTS

Seven patients were found and their clinical data summarized in Table 1. All patients were young men (range 23–36 years) and sustained their injuries at work. Five were employed as labourers, one was a plasterer and another a foreman.

All had injuries to the lower limb incurred as a result of kneeling directly onto the wet cement or by the cement becoming trapped inside a boot. Only one had additional superficial burns to the tips of his fingers. The majority of lesions were multiple and most under 2 cm in diameter, although in two cases (5 and 6) large areas of ulceration developed following contact with cement (8 × 6 cm and 3 × 8 cm respectively). Four had areas of full thickness skin loss, of which, two, were severe enough to require referral to a specialist unit; of the latter, one (5) required debridement and delayed skin grafting whilst the other (6) was treated conservatively. Out of the other five patients followed up at The Central Middlesex Hospital, one failed to return and the remaining were treated with dressings (Jelonet and Betadine). A median of seven visits (range 4–16) were required before the burns had healed.

In order to determine the accuracy of written information on cement bags on sale, four large wholesalers and DIY stores were visited. Seven brands of cement were examined. Of these only two were explicit in the problems caused by cement. The others stated that contact should be avoided to prevent harm to sensitive skins, implying that only those with sensitive skin could be affected. All gave advice about first aid treatment. Only one wholesaler had a leaflet concerning cement and safety readily available to the public, although most brands of cement state that more advice is available from the company on demand.

DISCUSSION

It is known that ulceration and necrosis can follow contact with wet cement (Hannuksela et al., 1976; Vickers & Edwards, 1976; Rycroft, 1980; Buckley, 1982). Initial symptoms are few apart from a sensation of burning, however on examination of the skin there may be erythema, ulceration develops after 12 h. This lack of initial symptoms may lead to a delay in first aid measures. Cement contains large amounts of calcium oxide in combination with silicon dioxide and aluminium oxide. Calcium oxide, otherwise known as lime, combines with water to form calcium hydroxide. Sodium and potassium monoxide are present and are also subsequently converted to sodium and potassium hydroxide in the presence of water. It is the high alkalinity of cement (pH 12) that makes it a caustic substance.

This series differs from others in that all patients were professional workers using cement in an environment where one would assume that the hazards of cement would be well known. Most workers know that cement can cause skin
### Table 1. Clinical data of patients attending with cement ulceration.

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Occupation</th>
<th>Site</th>
<th>Area</th>
<th>Severity</th>
<th>Treatment</th>
<th>Number of visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) 23</td>
<td>M</td>
<td>Plasterer</td>
<td>Both knees</td>
<td>1.5 cm</td>
<td>Full thickness</td>
<td>Oral Erythromycin/Betadine and Jelonet dressings</td>
<td>7</td>
</tr>
<tr>
<td>(2) 28</td>
<td>M</td>
<td>Labourer</td>
<td>Both Feet</td>
<td>Multiple (small)</td>
<td>Partial thickness</td>
<td>Savlon and Jelonet dressings</td>
<td>4</td>
</tr>
<tr>
<td>(3) 24</td>
<td>M</td>
<td>Labourer</td>
<td>Both ankles</td>
<td>Not recorded</td>
<td>Not recorded</td>
<td>Oral Erythromycin/Savlon and Jelonet dressings</td>
<td>5</td>
</tr>
<tr>
<td>(4) 23</td>
<td>M</td>
<td>Labourer</td>
<td>Left foot</td>
<td>1 cm²</td>
<td>Full thickness</td>
<td>Savlon and Jelonet dressing</td>
<td>Failed to return In-patient 7 days. Failed to return.</td>
</tr>
<tr>
<td>(5) 36</td>
<td>M</td>
<td>Foreman</td>
<td>Knees, feet and fingers</td>
<td>L foot 8 x 6 cm</td>
<td>Full thickness</td>
<td>MVH-debridement, antibiotics &amp; delayed skin grafting.</td>
<td>16</td>
</tr>
<tr>
<td>(6) 25</td>
<td>M</td>
<td>Labourer</td>
<td>Ankles and Shins</td>
<td>1 x 1 - 3 x 8 cm</td>
<td>Partial thickness</td>
<td>Dressings/attended another A&amp;E Scarring</td>
<td>8/52 off work</td>
</tr>
<tr>
<td>(7) 35</td>
<td>M</td>
<td>Labourer</td>
<td>Ankles</td>
<td>1 cm</td>
<td>Deep partial thickness</td>
<td>MVH-oral Erythromycin, Betadine dressings. Hyperpigmented scarring</td>
<td>10</td>
</tr>
</tbody>
</table>

MVH-Plastics Unit, Mount Vernon Hospital.
problems but many are not aware of the serious ulceration that may result from contact with cement.

All patients had burns to the lower limb in areas likely to have been points of pressure from kneeling on wet cement or from cement getting caught in boots. Prolonged contact and pressure are said to be prerequisites for the development of cement burns (Fisher, 1979). The largest series so far published, also of seven patients, and was presented by Hannuksela et al. (1976). In previously reported cases the ulcers healed leaving either hyperpigmented scars (Rycroft, 1980; Buckley, 1982) or depigmented areas (Vickers & Edwards, 1976). In others skin grafting was required (Rowe & Williams, 1963; Fisher, 1979; Buckley, 1982). In those cases where in-patient or out-patient treatment was documented 7/12 needed admission. Only one patient (5) required admission in our series, but the burns were slow to heal and repeated visits were needed for treatment. Two patients (5 & 7) were unable to work for a period of 5 and 16 weeks respectively.

Treatment in the first instance includes removing the wet cement, drying the exposed area and changing contaminated clothes. The area should be washed with water or diluted vinegar to lower the pH. As always prevention is best, watertight boots should be worn and workers should not kneel directly on the cement but use a board.

Dermatological problems other than burns and ulceration can result from contact with cement. An irritant dermatitis may occur as a result of it’s hygroscopic property leading to fissuring and dryness of the skin. When silica is mixed with cement to form concrete the mixture becomes gritty, the abrasive action of which exacerbates skin damage. A contact dermatitis can result from an allergic response to the dichromates in the cement and other allergens such as nickel and cobalt may be present. Patch testing for sensitivity to chromates is however usually negative. Most problems occur with wet cement, although an ulcerative dermatitis from hardened concrete has been reported (Stoermor & Wolz, 1983). This occurred after two obese workers carried concrete bricks in their arms whilst it was raining.

Cement must now carry a warning informing users of the dangers from contact with cement. However this study shows these warnings are not explicit enough and persons using cement are still unaware of the serious skin problems caused by wet cement. We would propose that these warnings be improved and that site managers and those delivering cement should warn individuals of the dangers.

REFERENCES