lesions[2] – an exhaustive review by Ferlito et al[3] indicated a local-control rate of 43% with radiotherapy. This compares unfavourably with 81%–92% local control according to site with primary surgery, but does not discount effective treatment with salvage surgery after failed radiotherapy at sites susceptible to significant operative morbidity.[4] Relative radio-resistance may be a reflection of limited cellular proliferation in all but the basal layers and periphery of lesions.[5]

However, we would take issue with the authors' aversion to radiotherapy on the grounds of '... anaplastic transformation with possible lymph-node invasion'. This phenomenon is very rare and may occur after surgery or in the absence of any treatment.[3,4] Post-radiotherapy metastasis may represent progression of the conventional squamous cell carcinoma component of an inadequately sampled 'hybrid' verrucous carcinoma.[4] We acknowledge that regional lymphadenopathy is often a feature of verrucous carcinoma, but almost invariably it represents little more than a florid inflammatory response to the tumour.[2,4] In the context of an invasive verrucous carcinoma with lymphadenopathy, we would suggest initial nodal sampling as diagnostic validation for more extensive lymphadenectomy.

Yours faithfully,

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Reaction in a red tattoo in the absence of mercury

Sir,

Tattooing has been practised for thousands of years, and a number of causative agents have been implicated in tattoo reactions, depending on the colours used. Green chromium,[1] blue cobalt,[2] purple manganese,[3] yellow cadmium,[4] and red mercuric sulphide (cinnabar)[5,6] have all been reported to produce reactions.

Mercury is well known to be a cause of reactions in red tattoos, and a move has been made to use alternative agents in the dye. Ferric hydrate, cadmium selenide and vegetable dyes have been used to replace mercury, but sensitivity still occurs.

Figure 1—Inflammatory reaction in the red areas of a tattoo on the dorsum of the right forearm.

A 63-year-old male presented to our department with an inflammatory reaction to a tattoo performed 18 months previously, situated on the dorsum of the right forearm (Fig. 1). The symptoms were confined to the red areas of the tattoo, and were photosensitive. Symptoms had begun 6 months after the initial tattooing, following exposure to sunlight, and involved intense pruritus with induration and erythema confined to the red areas. Systemic illness was not a factor. Although the symptoms eased when the tattoo was protected from sunlight, a degree of itching still remained. Antihistamines and steroid creams did not improve the condition. He had previously had a number of other tattoos, performed at various parlours, which remained unchanged and symptom-free, even where red colouring had been used.

Excision and skin grafting were performed with a good result, and the excised tissue was analysed.

Tissue analysis tested for a number of metals, including mercury, iron, lead and cadmium. Skin patch testing was not performed as previous studies have shown this to be ineffective.[7]

Histological examination revealed heavy dermal inflammation with nodular pruriginous change and focal epidermal erosion, with tissue analysis showing the presence of cadmium. No infective cause was identified.

Numerous studies have previously shown mercury to be the likely causative agent in red-tattoo reactions,[5,6] and hence modern dyes tend to be based on other ingredients, including cadmium. Despite this move to alternative compounds, sensitivities continue to be seen to tattoos using red dye.[7] Whereas some reactions seen today may be attributed to tattooing performed prior to mercury exclusion, other reactions must be due to agents used in the alternative dyes.

Cadmium, also used in photoelectric cells, has been shown to be a cause of photosensitivity in red tattoos,[5–7] even in the absence of other metals. This seems to be the case in this patient, who exhibited a photosensitive reaction to his tattoo, confined to the red (cadmium containing) areas. Sarcoidosis has been shown to present in tattoos,[8] but our patient showed no clinical features of the condition.

When presented with a red-dye reaction in a recent tattoo, mercury can no longer be presumed to be the cause because its exclusion from dye manufacture has not resulted in the cessation of sensitivity reactions. In tattoos performed recently, using mercury-free dye, cadmium should be suspected if photosensitivity is limited to red areas only.

Yours faithfully,

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Preoperative surgical skin marking in plastic surgery

Sir,

In plastic and reconstructive surgery the importance of fine accurate indelible preoperative skin markings of key reference points and lines is essential if surgery is to be precise. Often the visible success of the operation is determined by this. Skin markings made preoperatively need to be robust to withstand the surgical skin preparation with antiseptic prepping solutions.

Innovative methods of surgical tattooing and skin scratching[1,2] have the potential to cause hypertrophic scarring and keloid formation, as well as being rather cumbersome and often requiring the patient to be anaesthetised prior to marking. The use of cotton felt-tipped pens and the ability of their inks to withstand the rigours of surgical skin preparation have been investigated by others,[3,4] and the results reveal a wide variation in the permanence of the inks.

We investigated a small sample of skin-marking pens used commonly in plastic surgery departments in southeast England. Theatre sisters were contacted in a number of hospitals to ascertain local practice among plastic surgeons. Viomedex® and Porex® surgical skin-marking permanent-ink felt-tipped pens and the Sommerlad pen in association with Bonney's Blue ink (BP1980 brilliant green 0.5% w/v, crystal violet 0.5% w/v and alcohol absolute 45% v/v) were reported as by far the most commonly used. A small study using six such pens was carried out on the forearm skin of a volunteer to determine their relative 'permanence' and their ability to withstand surgical skin preparation. In keeping with recent trends advocating the use of alcohol-based over aqueous-based paints,[5] two commonly used skin paints, Betadine® (povidone iodine United States Pharmocopeia 10% w/v) and Hydrex® (pink chlorhexidine gluconate 0.5% w/v in 70% v/v industrial methylated spirits) were used to clean forearm skin markings made with these six pens (Fig. 1). To standardise, a single operator cleaned each marking for a period of 60 s. The end results are shown in Figure 2 and the associated tabulation of subjective scoring of durability (range: 0 = disappeared, through to 5 = no fading) is shown in Table 1.

The results confirm the relative indelibility and success of the Viomedex® pen in withstanding both alcohol-based skin preparations. The Sommerlad pen with Bonney's blue ink showed excellent resilience to povidone iodine but was poor with chlorhexidine gluconate. No skin marking approached a maximal score in withstanding the use of both these commonly

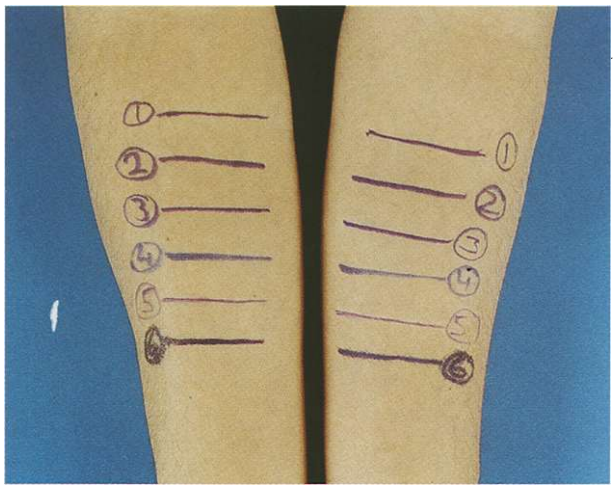

Figure 1—Pre-preparation skin markings on volunteer's forearms.

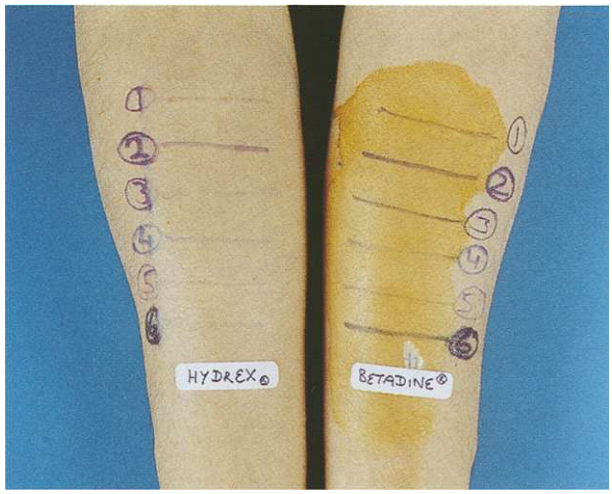

Figure 2—Results following preparation with chlorhexidine gluconate (right forearm) and povidone iodine (left forearm).