One of the more commonly used maxims in dermatology is the one that states: ‘If it’s wet, dry it; if it’s dry, wet it.’ While this may be a vastly understated description of the art and science of dermatology, it does reflect the prevalence of xerotic (abnormally dry) and exudative dermatoses that are encountered on a daily basis by community nurses.

In the case of skin that is too ‘dry’ — atopic eczema for example — this is usually managed with an intensive emollient regimen, consisting of a soap substitute, the regular application of moisturisers and the addition of topically applied disease-modifying drugs; or, in more severe cases, systemic disease-modifying drugs.

However, the real nursing challenge often lies in the opposite scenario, where the skin is too ‘wet’, for example in varicose or gravitational eczema, and it is here that there is a dearth of adequate treatments. This article considers the efficacy of one application — eosin solution — and whether it should be adopted by community nurses, as well as comparing its efficacy with a much more frequently used application, potassium permanganate.

Among the challenges facing community nurses in their day-to-day practice is one that impacts greatly on patients, relatives and healthcare providers — the management of exudating skin conditions and wounds. This article looks at eosin solution, a popular treatment option for exudative dermatoses on mainland Europe, to the extent of being commercially available to the general public, but one which has dwindled in popularity in the UK. This article provides an introduction to this versatile non-toxic dye and outlines its potential application in the community setting by comparing it with the much more widely used alternative potassium permanganate.

KEYWORDS:
Skin care | Leg ulcers | Astringents | Topical treatment | Eosin

THE SO-CALLED ‘SPECIALS LIST’

There is a further formulary of non-licensed medications available to those who require access to dermatology treatments in the course of their practice — this is known as The Specials Recommended by the British Association of Dermatologists for Skin Disease (Buckley et al, 2014) or the specials list.

This has developed due to the limited number of licensed products available to treat dermatology conditions. Over time local dermatologists — with support from local pharmacy-manufacturing units — have created a number of unique topical preparations. These are widely used by dermatologists but never scrutinised under research conditions; similarly, it is unlikely that any pharmaceutical company will test the efficacy of one application — eosin solution — and whether it should be adopted by community nurses, as well as comparing its efficacy with a much more frequently used application, potassium permanganate.

PRESCRIBING — WHAT ARE ‘SPECIALS’?

Most clinicians qualified to prescribe do so from a list of licensed medicines whose safety and efficacy have been tested and assured. However, for many common dermatological conditions — including psoriasis and eczema — the range of licensed medicines is limited. As a result, clinicians looking to prescribe dermatology medicines and treatments often rely heavily on unlicensed preparations (mainly creams and ointments) known as ‘specials’. These contain a variety of different ingredients such as tars, dithranol, salicylic acid, steroids etc, in a variety of concentrations. This variety can be particularly problematic in primary care where a lack of price controls as well as the absence of quality control can lead to increased costs and concern about safety. To address these concerns and to help improve quality of care, the British Association of Dermatologists (BAD) formed a working group to rationalise these preparations into a list of preferred ‘specials’, or treatments that it considers suitable in certain clinical scenarios.
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In 2014, the British Association of Dermatologists (BAD), along with pharmacists and compilers of the British National Formulary (BNF), rationalised this burgeoning range of preparations into the 40 items featured on the ‘specials list’ (Buckley et al, 2014).

THE ‘WET’ WOUND

As mentioned above, problems arise when the skin is too ‘wet’, for example in varicose or gravitational eczema. During the inflammatory stage of wound healing, damage to the endothelial cells lining the blood vessels causes them to release inflammatory mediators resulting in vasodilation and increased blood flow to the site. The vessels also become more ‘leaky’ or permeable, with fluid leaking from the blood into the wound. This fluid is known as exudate (World Union of Wound Healing Societies [WUWHS], 2007).

In the author’s personal experience of skin conditions that produce a high volume of exudate, topical disease-modifying drugs either in the form of creams or ointments can ‘slide off’ the skin necessitating frequent dressing changes. In this scenario, a topical astringent preparation (such as potassium permanganate) is useful (an astringent is a chemical compound that tends to ‘shrink’ or constrict the body’s tissues). Because an astringent contracts the body’s tissues, it will reduce secretions; a topical astringent may also have anti-inflammatory properties which can constrict local blood vessels and further reduce the leakage of serous fluids.

Unfortunately, the BNF (Royal Pharmaceutical Society of Great Britain [RPS] and BMJ, 2015) does not offer many options, and the one topical astringent listed with which most community nurses will be familiar is potassium permanganate. However, this represents a narrow choice for the treatment of exudating dermatological conditions, especially as potassium permanganate may not be the safest and most efficacious option (see below).

Potent topical corticosteroids can also be used for their anti-inflammatory effect, and when applied directly onto ulcers can lead to a reduction in exudate (Hofman et al, 2007). However, these topical corticosteroids do have side-effects such as telangiectasia (a thinning of cutaneous tissue) and exacerbation of localised infections — particularly fungal infections — and there is also a risk of systemic absorption.

Potassium permanganate

Potassium permanganate (KMnO4) has been used for many years and in a number of medical conditions, not solely as an astringent. In the late 1800s for instance, its was advocated as an antidote for opium poisoning (Luff, 1896) as well as treating what was thought of as insanity associated with amenorrhoea (absence of menstruation) (Deas, 1885), while in the 1950s it was used as an abortive agent leading to incidences of vaginal ulcerations (Alment and Nicol, 1953).

Today potassium permanganate is widely used for the decontamination and deodorisation of waste water and in the management of nuisance organisms in water treatment centres (US Environmental Protection Agency, 1999), as well as being used extensively in the production of cocaine (United Nations Office on Drugs and Crime (UNODC), 2009).

However, most community nurses will have come across its use in exudating skin conditions, most notably gravitational eczema with associated lower leg venous ulceration. Before the introduction of soluble tablets (Permitab; Alliance Pharmaceuticals), potassium permanganate was supplied in crystal form and achieving the correct dilution was more an art than a science, requiring a certain shade of pink or purple — opinions on the correct dilution varied from nurse to nurse. Some local chemists would helpfully supply a ready-made solution which could then be further diluted to the required strength. The complicated method of preparing potassium permanganate, i.e. adding one Permitab to four litres of water (ensuring that it had completely dissolved to prevent the risk of chemical burns), then soaking the area for 10–15 minutes before rinsing the potassium off the skin with clean water, are disadvantages not shared by eosin solution.

Another disadvantage of potassium permanganate (which nurses may or may not be aware of) is that it is classified as hazardous waste and should be disposed of appropriately. The manufacturers of Permitabs state on the packaging that clinicians should ‘avoid release to the environment’ and that it is ‘very toxic to aquatic life with long-lasting effects’. Similarly, advice from the Environment Agency on the disposal of potassium permanganate, states that it is classified as ‘offensive hygiene waste’ and that ‘specialist treatment or disposal is required’ (http://tinyurl.com/o69wteq).

In December 2014, NHS England also released an alert to raise awareness of the risk of death or serious harm from accidental ingestion of potassium permanganate preparations that are for external use (http://tinyurl.com/k9shx3y), further demonstrating the potentially hazardous nature of potassium permanganate.

In the author’s clinical opinion, the potential dangers of potassium permanganate mean that community nurses could consider the use of eosin solution as an alternative.

EOSIN SOLUTION

One of the products available from the specials list mentioned above is eosin solution 2% w/v (Tayside Pharmaceuticals Ninewells Hospital Dundee). Eosin is essentially a...
Visit: http://www.jcn.co.uk
In the 1980s, eosin was recommended for a range of conditions in the ABC of Dermatology series of textbooks, including:
- Infected eczema (Buxton, 1988)
- Infected leg ulcers (Buxton, 1987)
- Moist psoriasis (Going, 1987).

Eosin is still recommended for weeping eczema, superficial ulcers and seborrhoeic dermatitis (Berk-Jones, 2004), with the evidence supporting its use based on a number of small studies. In 1999, an Israeli study showed that eosin was more efficacious than a topical steroid (clobetasone butyrate 0.05%) in treating ‘nappy rash’ (Arad et al, 1999), while a more recent study also compared eosin with topical steroids, but this time in the treatment of psoriasis, with the authors concluding (Tabolli et al, 2009):

‘The low cost of eosin treatment and its limited collateral effects suggest that eosin could be an effective steroid-sparing agent in the initial phase of psoriasis treatment.’

Lapidoth et al (2009) were able to identify the intracellular effect of eosin in the healing of ulcerated haemangiomas, while Zampetti et al (2009) were able to demonstrate eosin’s effect on cytokines in the treatment of psoriasis.

As well as being identified for their astringent effects, both potassium permanganate and eosin have also been used — quite erroneously — for their perceived antiseptic benefits. When potassium permanganate was compared with chlorhexidine, it was found to have a much-reduced bactericidal action (Stalder et al, 1992).

In 2013, research released by the BAD compared four traditional antiseptics (0.1% benzalkonium chloride; 6% hydrogen peroxide; 2% aqueous eosin; and 1:10,000 potassium permanganate), concluding that (Leitch et al, 2013):

‘Aqueous eosin and potassium permanganate may have desirable astringent properties, but these results suggest they lack effective antiseptic activity.’

There is no data available evaluating or comparing the astringent attributes of either potassium permanganate or eosin; it would also be very difficult to undertake a double-blind placebo research project into their use as the participants would be either having their skin painted bright red or soaked in a purple solution for 10–15 minutes.

Application of eosin

Before eosin is considered, the patient should be consulted about the potential side-effects of stinging. Also, if there is copious exudate, the subsequent strikethrough can stain the patient’s clothes. In the author’s personal experience, community nurses should be careful not to get eosin on their own skin during application as the dye takes a number of days to fade.

The area to be treated should initially be washed with tap water and an appropriate soap substitute with or without antiseptic. A small amount of eosin should be decanted into a galley pot (Figures 1 and 2). To prevent cross-infection, any surplus solution should not be poured back into the bottle.

A gauze swab is then dipped into the solution (Figure 3), and for the initial treatment a small area of the ulcer is painted and left for five minutes (Figure 4). If the patient does not experience any discomfort, the whole area can painted (Figures 5 and 6).

The area can be dressed immediately. If a second topical preparation has been prescribed, the eosin should be left 5–10 minutes before this is applied.

The wound pictured here was a chronic ulcer secondary to pyoderma gangrenosum, which was heavily exuding. Forty-eight hours after the eosin application, the patient reported that there was less exudate from the wound and no discomfort. The patient’s remaining ulcers were also treated with eosin 2%.

CONCLUSION

The evidence cited above does...
support the empirical wisdom of dermatologists, who have always maintained that eosin is more than simply a dye and in fact can be used as an anti-inflammatory product with associated astringent properties. This offers nurses another option in the treatment of exudative dermatoses.

As discussed previously, the use of potassium permanganate is cumbersome and potentially hazardous for the environment, patients and clinicians. In the author’s clinical experience, the ease of eosin application offers a much more comfortable treatment experience for the patient and a less time-consuming and labour-intensive treatment for the community nurse.

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