INTRODUCTION

Although orf is recognized as a major problem in sheep and goats worldwide, in human medicine it usually merits little attention as it is considered a minor infection with little morbidity and certain resolution. Some local medical practitioners who have suffered orf may not be so sanguine, however, with one consultant anaesthetist stating that he had never felt so systemically ill as during the first few days of infection. Nevertheless, orf is a self-limiting infection which rarely has significant complications, and consequently research has been limited. It is certainly a more common infection than formal reporting systems would suggest, and thus merits further consideration.

Orf has a number of synonyms, including contagious pustular dermatitis, ecthyma contagiosum, and, in sheep, scabby mouth. Indeed there are believed to be at least 80 synonyms for orf. The origin of the word ‘orf’ is disputed, some suggesting it is derived from the Anglo-Saxon name for cattle, others considering it derives from ‘hrufa’, the Nordic name for a scab or boil. In the UK it was first reported as a problem in goats in 1879 and in sheep in 1890. It was in 1923 that the condition was shown to be a filterable agent with it being confirmed in 1948 that it was due to a virus. Visualization of the virus came with the application of electron microscopy in the early 1960s. Human infection was first described in 1934 when it was shown that material from a human lesion could cause characteristic lesions in sheep. Thus it appears orf has been recognized for only approximately 100 years. It is difficult not to believe, however, that orf has been with us far longer, and the relatively recent recognition probably reflects its low significance compared with the many other life-threatening infections prevalent up to the middle of this century, and perhaps the stoicism of the sheep farmer.

VIROLOGY

Orf virus is a parapoxvirus and is one of only two viruses in this group that can infect humans. The other usually infects cattle and is milker’s nodule, whose common synonyms are pseudocowpox and paravaccinia. Para-poxviruses have a distinctive morphology on electron microscopy (EM), being ovoid particles with a criss-cross pattern of tubules on the surface (Fig. 1). Orf and milker’s nodule viruses are similar in appearance, and although the latter virus particle is usually somewhat larger, distinguishing the two by EM can be difficult. The two viruses also show cross-reactivity in serological tests and only relatively recently has analysis of the viral DNA been able to show distinctive differences.
PSEUDOCOWPOX

The lesions of pseudocowpox usually occur on the teats of dairy cattle, but occasionally on the mouth and muzzle. In humans, milker's nodules usually occur on the hands and are said to be somewhat different in appearance from orf, being hemispherical cherry-red papules which over a few days enlarge into purple, firm but elastic, hemispherical nodules, which may then umbilicate. This mass of granulation tissue gradually absorbs, with resolution in 4-6 weeks. It may well be that milker's nodule may not be easy to distinguish clinically from orf\(^5\), and I have never been involved in the diagnosis of a case, although up to 10% of UK laboratory-confirmed reports of orf/paravaccinia occur after contact with cows\(^6\). The key feature should be the history of contact with cattle rather than sheep, and I would be eager to investigate any possible cases as pseudocowpox is not uncommon in Lancashire (DF Gibbon; personal communication). Over the last 15 years, between 5 and 30 reports per annum of pseudocowpox in cattle have been received by the Epidemiology Unit, Central Veterinary Laboratory, Weybridge (personal communication) with most reports being in spring and early summer.

HUMAN ORF

For human orf the incubation period is some 3-6 days following inoculation or contamination of skin abrasions. Lesions are usually single, but may be multiple and it is the hand or forearm that is most frequently affected. However, when the UK laboratory-confirmed reports between 1975 and 1981 were reviewed in 1982\(^7\), of 344 reports 9 were on the face (Fig 2) and ear, and one each on the groin, scrotum and perianal region! These figures are almost certainly biased by lesions in unusual sites being more likely to be investigated and reported.

Lesions are said to progress through a series of specific stages\(^8\). Some blurring may often occur, however, with it being difficult to ascribe a lesion to a specific stage. The initial lesion is an erythematous papule which soon progresses to the 'target' stage, characterized by a red centre surrounded by a white ring and outer inflamed halo. This then becomes nodular, possibly with some exudate from the surface, and then crustated and granulomatous, before healing occurs. The natural history of the lesion is usually 4-6 weeks, although persistence for over a year has been observed. Primary infection does not confer life-long immunity; reinfections are well-established with one case of virologically confirmed primary infection and reinfection occurring within 14 months\(^9\).

Characteristically the lesions are painless, although perhaps pain is a more frequent feature than is usually assumed. A number of complications have been recorded\(^10\) with perhaps the most serious being the development of a giant orf granuloma, which may have a close clinical similarity to a pyogenic granuloma\(^11\). On rare occasions\(^12\) amputation has been performed. Other local complications include bacterial superinfection, lymphadenitis and lymphadenopathy. As noted at the beginning, a non-specific systemic febrile illness can occur, as may erythema multiforme\(^13\). Of the 344 UK reports between 1975 and 1981, there were seven patients with erythema multiforme and one with a generalized vesicular rash\(^14\). In reported cases of generalized varicelliform eruptions associated with orf, virus has not been demonstrated in the vesicles remote from the primary lesion.

EPIDEMIOLOGY

Over the period 1975-1986, only 28-69 virologically-confirmed cases were reported per annum for England and Wales (Fig. 3, Communicable Disease Surveillance Centre; personal communication). This is certainly a gross underestimate of the number of cases that occur. Orf is instantly recognizable to the majority of sheep farmers, who will be aware of the natural history and that medicine has little to offer. Similarly rural GPs will almost certainly not need the services of the virus laboratory to make the diagnosis. Often those patients who are investigated are being seen by trainee GPs or in accident and emergency departments. Orf is reported from all regions of England and Wales, with no region being pre-eminent.

Fig 2 - Facial orf

Fig 3 - Number of laboratory-confirmed reports of orf/paravaccinia in England and Wales
Most patients are adults (only 6% being under 15 years of age\(^8\)), with men being reported twice as frequently as women. As would be expected most cases are in sheep farmers, but abattoir workers are also at significant risk. Indeed, one survey in New Zealand showed that 1.4% per annum of meat industry workers became infected\(^9\). Other groups at occupational risk are veterinary workers and butchers. Human-to-human transmission is exceptionally rare, with only one validated case reported, although transmission back from human to sheep can occur.

### DIAGNOSIS

Orf virus can only be isolated in cell culture with difficulty, and is not usually attempted. The diagnostic approach of choice is to examine scrapings, biopsy or other material by EM, when the characteristic virions can often readily be seen. The failure to visualize the virus does not exclude the diagnosis.

Serological techniques are not available, but would occasionally be of help. We have done some initial work using immunofluorescent techniques with cell culture infected by a laboratory-adapted strain. The results are promising and we intend to develop the technique, primarily for seroepidemiological studies. Acute and convalescent sera from suspected cases of orf would be extremely valuable to adapt the technique to demonstrate recent infection, and such sera would be gratefully received.

### TREATMENT

There are anecdotal reports of the apparent efficacy of topical idoxuridine (IDU) in the treatment of orf\(^8\),\(^9\), but no properly conducted trials. Although in vitro activity of IDU has not been demonstrated, it is likely that it (and also acyclovir) would have antiviral activity against orf.

### LOCAL STUDIES

To try to demonstrate in a double-blind placebo-controlled trial whether IDU was effective in shortening the duration of the lesion, I commenced such a trial some years ago. It was considered that to be of value a reduction of 50% in the duration of the lesion was required, and to demonstrate such an effect 50 patients would need to complete treatment. Although the study started promisingly, recruitment fell away so that only 26 patients were initially entered and only 21 completed the protocol.

Of the 26 patients, 16 were male and 10 female. In 18 cases there was a single lesion, but in 4 cases there were 2 lesions, 3 cases 3 lesions, and in 1 case 5 lesions. Seven of the patients complained of local pain and 7 had a rash of some type. Four gave a history of previous orf. The duration to complete healing was between 1 and 8 weeks (active or placebo therapy not known as the code was not broken due to insufficient numbers). Thirteen of the patients had samples submitted for EM, but virus was only seen in 9. Of some interest was the range of self-administered home therapies used before presenting to their general practitioners (Table 1).

### Trial of idoxuridine for therapy of orf.

**Self-administered medication prior to presentation.**

- Savlon
- Dettol
- Germolene
- Terramycin spray and other topical tetracyclines
- Gentian violet
- 'White iodine'
- 'Ringworm ointment'
- 1 oz zinc, 1 oz powdered alum, 1/2lb lard
- Herpid

### CONCLUSION

Orf is a common zoonosis of those having contact with sheep. Although it is usually a minor localized infection, the inconvenience and the potential complications are such that its epidemiology, treatment and prevention are worthy of wider interest.

### REFERENCES


