

EDITORIAL

Cats, foxes and scabies: the epidemiological puzzle of sarcoptic mange

Richard Malik

HOW did I come to write this editorial, when I don't have much experience treating sarcoptic mange in cats and dogs? Many years ago, a colleague, Keith Mckellar Stewart, e-mailed me photos of a cat with severe crusting dermatoses. He said he had never seen anything like it. When I looked at the photos (Fig 1a), the lesions were mainly on and around the cat's head and ears and, truthfully, I had pemphigus foliaceus at the top of my list of diagnostic possibilities. Sensibly, I suggested doing some skin scrapes, which revealed enormous numbers of mites (Fig 1b).

He was embarrassed to have asked my advice, when he could have made the diagnosis so easily. The mites showed up in the skin biopsy (Fig 1c), so he would have made a definitive diagnosis in any case. But

what was the diagnosis? Keith and I were both convinced it was notoedric mange, as it looked like photos of a case we had been shown in lectures 20 years earlier. It is interesting that this 'illness script' (Lee and others 2010) had persisted in both of our minds after so many years. After all, notoedric mange is a well-described crusting dermatosis, and one of the seminal papers on this condition had been published in the *Australian Veterinary Journal* (English 1960). The only catch was that neither Keith nor I had ever seen a case! Interestingly, I have never met a vet who has diagnosed notoedric mange in cats in Australia in recent times, which would appear to be the same situation in the UK, as described by Hardy and others (2012) in the short communication summarised on p 351 of this week's *Veterinary Record*.

Keith sent me some skin scrapings. When they arrived, I delivered them to Sally Pope, a veterinary parasitology technician. Sally took some wonderful photos and made the diagnosis of sarcoptic mange, which was later confirmed at Shelly Walton's reference laboratory in Darwin using the criteria

Richard Malik, DVSc, DipVetAn, MVetClinStud, PhD, FACVSc, FASM,
Centre for Veterinary Education, The University of Sydney, New South Wales, 2006, Australia
e-mail: richard.malik@sydney.edu.au

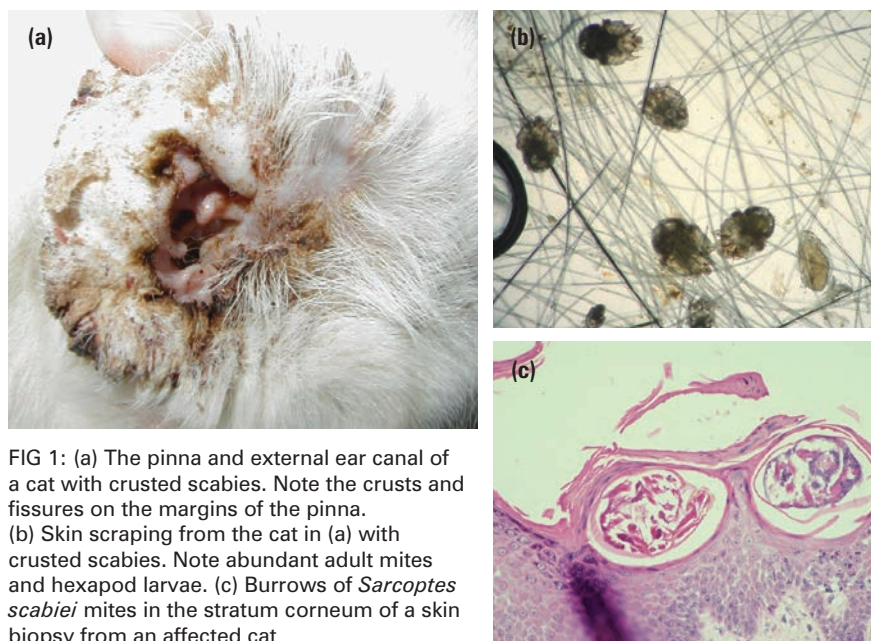


FIG 1: (a) The pinna and external ear canal of a cat with crusted scabies. Note the crusts and fissures on the margins of the pinna. (b) Skin scraping from the cat in (a) with crusted scabies. Note abundant adult mites and hexapod larvae. (c) Burrows of *Sarcoptes scabiei* mites in the stratum corneum of a skin biopsy from an affected cat

described by Hardy and others (2012). I asked Sally how she could be sure it was *Sarcoptes* and not *Notoedres*. She pointed out that *Notoedres* mites are smaller and have pointy spines. We did some work on e-databases, found the earlier work on sarcoptic mange in cats and chose a treatment plan based on the use of topical selamectin. We subsequently put together a series of feline sarcoptic mange cases by contacting colleagues in North America and the UK (Malik and others 2006). Interestingly, one case was a cat domiciled in London. The common feature in our case from the southern highlands in Australia, the London case and the current case report by Hardy and others (2012) was the link to 'urban foxes'.

In Keith's case, the cat lived on the outskirts of Mittagong and frequented a paddock known to harbour both foxes and 'mangy' wombats. This wombat association was germane because, in a veterinary context, the most important impact of scabies in Australia is on this ground-dwelling marsupial (Skerratt and others 1999, Skerratt 2005). It was commonly accepted that sarcoptic mange in wombats resulted from the importation of dogs and foxes into Australia during early British settlement (Morrison and others 2003). Wombats live in burrows during the day. Foxes can use these burrows, and the transmission of mites is much more likely when animals live in close proximity, in an environment protected from the desiccating effect of light but with adequate humidity. Thus, there is transmission of mange mites from fox to wombat, and subsequently from wombat to wombat.

Again there are striking parallels with the cat described by Hardy and colleagues (2012). Why does crusted scabies occur in wombats and some cats? Well, teleologically, it would make sense that,

if wombats had not encountered *Sarcoptes* mites until white settlers introduced fox hunting, the species would not have the impetus to evolve an effective immunological response to this genus of mite. The same might be true for cats and fox scabies, although other causes such as long-standing feline immunodeficiency virus infection, chronic renal disease, diabetes mellitus or occult neoplasia may, likewise, predispose cats to infestation. Interestingly, many of the cats reported with scabies have been older cats. The trouble with teleology is that, at best, it provides circumstantial evidence as to causality – in 2012, we should be able to do better than that. Confusingly, the molecular evidence suggests the mites that cause sarcoptic mange in wombats are different from the ones that cause mange in foxes (Skerratt and others 2002).

Some of the best genomics concerning *Sarcoptes* has been carried out by Shelley Walton, a scientist who has spent a lot of time at the Menzies Institute in Darwin. In Australia, scabies is a substantial problem in indigenous aboriginal communities. Crusted scabies is common in these settings, and the crusted, fissured, cutaneous lesions easily become secondarily infected with staphylococci and streptococci (Walton and Currie 2007). The streptococcal infections are especially problematic, as they are common and lead to non-suppurative immunological sequelae, such as rheumatic heart disease and glomerulonephritis, which greatly impact on lifespan (Roberts and others 2005). As a result of the importance of this disease in our indigenous people, human infectious disease clinicians like Bart Currie have developed a deeper understanding of the epidemiology and immunology of scabies in people, and Shelley was a key part of this research team.

For example, they proved beyond doubt that the scabies mite that causes human scabies is distinct at the molecular level from the mite that causes scabies in aboriginal camp dogs (Walton and others 1999).

In research, even single case studies contribute to knowledge. A clearer picture of why cats get scabies is slowly emerging. The diagnosis and treatment are straightforward, but the epidemiology is complex. One way to further our understanding is for mites from affected cats to be sent to Shelley Walton at the University of Southern Queensland for archiving (easily achieved in 95 per cent ethanol). When sufficient mites have been collected and funding becomes available, it will be possible using appropriate PCR assays and sequencing to determine if the mites on cats are distinct, or the same mites that live on foxes and wombats (Walton and others 1997). In this way, small animal clinicians can add a few extra pieces to the epidemiological puzzle of sarcoptic mange.

References

- ENGLISH, P. R. (1960) Notoedric mange in cats with observations on treatment with malathion. *Australian Veterinary Journal* **36**, 85-88
- HARDY, J. I., SINCLAIR, G., FOX, M. T. & LOEFFLER, A. (2012) Feline sarcoptic mange in the UK: case report. *Veterinary Record* doi:10.1136/vr.101001
- LEE, A., JOYNT, G. M., LEE, A. K., HO, A. M., GROVES, M., VLANTIS, A. C., MA, R. C., FUNG, C. S. & AUN, C. S. (2010) Using illness scripts to teach clinical reasoning skills to medical students. *Family Medicine* **42**, 255-261
- MALIK, R., MCKELLAR STEWART, K., SOUSA, C. A., KROCKENBERGER, M. B., POPE, S., IHRKE, P., BEATTY, J., BARRS, V. R. D. & WALTON, S. (2006) Crusted scabies (sarcoptic mange) in four cats due to *Sarcoptes scabiei* infestation. *Journal of Feline Medicine and Surgery* **8**, 327-339
- MORRISON, D. A., LJUNGGREN, E. L. & MATTASON, J. G. (2003) The origin of *Sarcoptes scabiei* in wombats. *Parasitology Research* **91**, 497-499
- ROBERTS, L. J., HUFFAM, S. E., WALTON, S. F. & CURRIE, B. J. (2005) Crusted scabies: clinical and immunological findings in seventy-eight patients and a review of the literature. *Journal of Infection* **50**, 375-381
- SKERRATT, L. F. (2005) *Sarcoptes scabiei*: an important exotic pathogen of wombats. *Microbiology Australia* **June** 79-81
- SKERRATT, L. F., CAMPBELL, N. J. H., MURREL, A., WALTON, S., KEMP, D. & BARKER, S. C. (2002) The mitochondrial 12S gene is a suitable marker for populations of *Sarcoptes scabiei* from wombats, dogs and humans in Australia. *Parasitology Research* **88**, 376-379
- SKERRATT, L. F., MIDDLETON, D. J. & BEVERIDGE, I. (1999) Distribution of the life cycle stages of *Sarcoptes scabiei* var *wombati* and effects of severe mange on common wombats in Victoria. *Journal of Wildlife Diseases* **35**, 633-646
- WALTON, S. F., CHOY, J. L., BONSON, A., VALLE, A., MCBROOM, J., TAPLIN, B., ARLIAN, L., MATHEWS, J. D., CURRIE, B. & KEMP, D. J. (1999) Genetically distinct dog-derived and human-derived *Sarcoptes scabiei* in scabies-endemic communities in northern Australia. *American Journal of Tropical Medicine and Hygiene* **61**, 542-547
- WALTON, S. F. & CURRIE, B. J. (2007) Problems in diagnosing scabies, a global disease in human and animal populations. *Clinical Microbiology Reviews* **20**, 268-279
- WALTON, S. F., CURRIE, B. J. & KEMP, D. J. (1997) A DNA fingerprinting system for the ectoparasite *Sarcoptes scabiei*. *Molecular and Biochemical Parasitology* **85**, 187-196

doi: 10.1136/vr.e6591

Cats, foxes and scabies: the epidemiological puzzle of sarcoptic mange

Richard Malik

Veterinary Record 2012 171: 346-347
doi: 10.1136/vr.e6591

Updated information and services can be found at:
<http://veterinaryrecord.bmj.com/content/171/14/346>

References

These include:

This article cites 10 articles, 4 of which you can access for free at:
<http://veterinaryrecord.bmj.com/content/171/14/346#BIBL>

Email alerting service

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
<http://group.bmj.com/group/rights-licensing/permissions>

To order reprints go to:
<http://journals.bmj.com/cgi/reprintform>

To subscribe to BMJ go to:
<http://group.bmj.com/subscribe/>