Rising incidence of canine transmissible venereal tumours in the UK

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CANINE transmissible venereal tumour (CTVT) is a transmissible cancer spread by direct transfer of living cancer cells between hosts, usually during mating. The disease typically manifests as genital tumours in both male and female dogs (Fig 1).

Extraordinarily, CTVT first arose from the cells of a single 'founder dog' that lived several thousand years ago. Rather than dying with this animal, the CTVT cell lineage has persisted by spreading among dogs as an allogeneic graft.[1-4] Today, CTVT is found in dogs worldwide,[5] and is the oldest and most prolific cancer known in nature.

Perhaps not unexpectedly, given its clonal nature, CTVT shows a characteristic clinical presentation and disease course.[6,7] Genital tumours are usually localised and friable, often producing serous or sanguineous discharge (Fig 1). Metastasis is relatively rare, and single-agent vincristine chemotherapy is usually curative.[5,8,9]

However, several unusual manifestations of the disease are occasionally observed. These include CTVT without genital involvement, presumably arising from non-coital transmission (Fig 2), and aggressive disease (including metastasis and treatment resistance), which in some cases is likely associated with host immunodeficiency.[10] Immune-mediated spontaneous regression is also a common outcome after experimental subcutaneous CTVT transplantation, but its frequency during natural infection is unknown.[8,11]

CTVT cells have passaged through thousands of hosts since the cancer's origin. Genetic evidence suggests that the CTVT founder dog was a husky-like animal that probably lived in northeastern Asia.[1,2,12] The cancer that was spawned appears to have remained localised for most of its existence before expanding into South Asia and Europe several centuries ago. CTVT subsequently spread rapidly around the world at least twice, probably carried by dogs travelling onboard shipping vessels.[1] The disease has since stably persisted at a low prevalence in many dog populations globally. However, in developed countries such as the UK, enzootic CTVT has been eradicated by eliminating free-roaming dogs.[5]

WHAT YOU NEED TO KNOW

- Canine transmissible venereal tumour (CTVT) is a sexually transmitted contagious cancer spread by direct transfer of living cancer cells from an affected dog to an unaffected dog.
- CTVT usually manifests as genital tumours, but extragenital tumours without genital involvement are also possible.
- CTVT is found in dogs worldwide and is often enzootic in countries or regions with free-roaming dog populations.
- Although CTVT is not enzootic in the UK, the incidence of the disease is rising due to the increasing number of dogs being imported from enzootic countries, particularly Romania. As such, screening for CTVT is recommended for dogs travelling to the UK from enzootic countries.
- Despite the increasing incidence of CTVT in the UK, the risk of domestic transmission is low and can be minimised by prompt diagnosis, rapid commencement of treatment and isolation of affected animals until clinical signs have resolved.
- Neutering reduces the risk of CTVT transmission but does not completely eliminate it.

The history of CTVT in the UK parallels that of other developed nations. The first report of CTVT in the UK was in 1810, when it was mentioned as one of only two cancers known to affect dogs (the other was mammary cancer).[13] In the early 20th century, the disease gained prominence as an experimental cancer model,[14] while outbreaks in breeding kennels caused occasional consternation.[15] However, its scientific interest had been largely forgotten by the middle of the century, and sporadic reports from the 1950s and 1960s suggest that CTVT cases were rare.[16,17] Today, enzootic CTVT is absent from the UK.[5]

Despite the disappearance of enzootic CTVT from the UK, the disease still occasionally appears in dogs imported from abroad,[5] with

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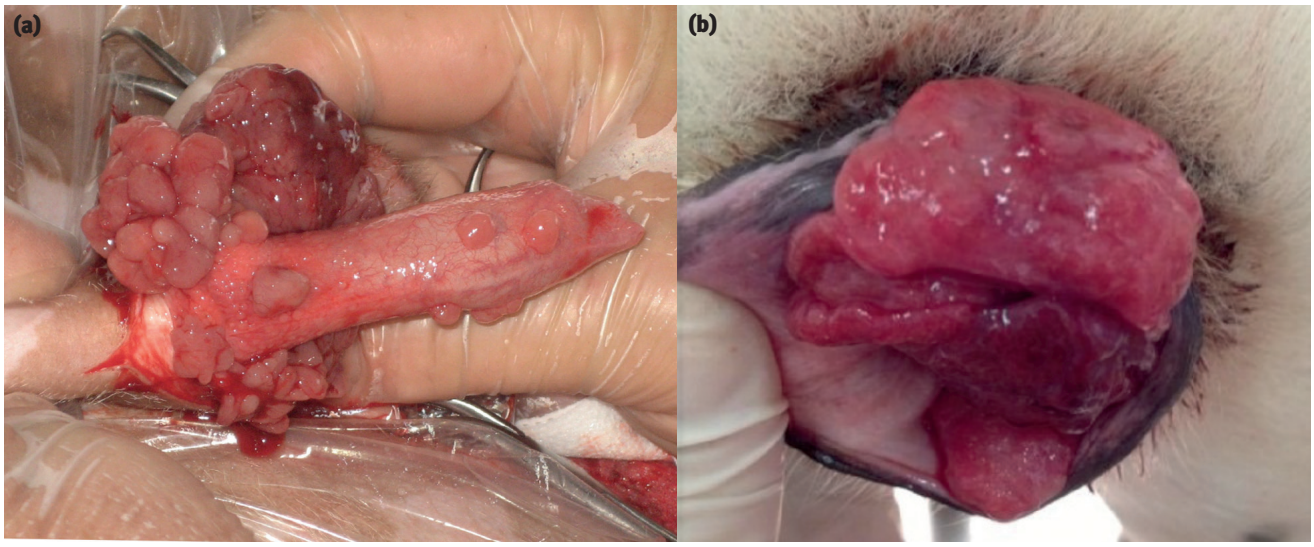

Fig 1: Typical canine transmissible venereal tumour involving the genital organs of (a) a male and (b) a female dog

recent reports suggesting that the number of imported cases detected is rising.[18] In a study summarised on p 475 of this issue of *Vet Record*,[19] Gibson and colleagues set out to investigate the incidence of CTVT cases in the UK over the past decade. To do this, they searched the anonymised electronic pathology records produced by four UK commercial pathology laboratories between 2010 and 2019 to identify confirmed cases of CTVT.

Seventy-one records met the inclusion criteria for confirmed CTVT. Overall, the fraction of pathology reports mentioning CTVT was extremely low (fewer than one case per 10,000 submissions). However, as suspected, the incidence of CTVT within the UK dog population appeared to have increased with time, with most of the affected dogs recorded as having been imported from countries where CTVT is enzootic, most commonly Romania.[19]

This finding raises the question of why CTVT incidence has risen in recent years. To try to answer this, Gibson and colleagues obtained dog importation data from the Animal and Plant Health Agency (APHA). These data confirmed that dog importation from Romania, a country with enzootic CTVT, has risen particularly rapidly during the past decade, suggesting that the increasing popularity of 'rescue' dog adoption from abroad may be driving the increase in CVTV incidence.[19] Importantly, it would appear that most rescue dogs destined for rehoming within the UK are incorrectly imported under a pet travel scheme that does not require health certification.[20]

However, it must be noted that, despite the increasing trend in incidence noted by Gibson and colleagues, CTVT remains extremely rare in the UK, with likely just a few dozen cases per year. The absence of a free-roaming host population means that the risk of enzootic CTVT becoming re-established within the UK is negligible. However, sporadic onward transmission among UK dogs, particularly within households, is a possibility. This risk can be minimised by prompt diagnosis, rapid commencement of treatment and isolation of affected animals until clinical signs are completely resolved. Neutering is also highly recommended, although owners should be advised that this does not totally eliminate the risk of transmission.[5,21,22]

Increasing awareness of CTVT, including its rare manifestations, among UK vets, owners and rescue organisations will help to lower the risk of import and domestic spread of the disease. In addition, regulatory agencies could contribute to reducing CTVT importation through explicit inclusion of the disease in preimport health examinations required for dogs arriving from enzootic countries.

In conclusion, CTVT is a unique cancer that constitutes a major health burden for dogs globally. Although enzootic CTVT can be eradicated from a country through the removal of free-roaming dogs, the work of Gibson and colleagues joins a body of literature highlighting how the movement of dogs across borders poses a risk of CTVT importation.[1,5,23,24] However, with a few small actions to increase awareness of the

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Fig 2: Extragenital canine transmissible venereal tumour (CTVT) without genital involvement is a rare manifestation of the disease. Examples of (a) ocular, (b) intranasal and (c) oral CTVT are shown. The ocular case also had numerous skin lesions

disease and strengthen preimport health checks, its impact on dogs in the UK will likely remain low.

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