Take home messages

1. We report the fourth described case of an association between cervical embryonal rhabdomyosarcoma and ovarian Sertoli–Leydig cell tumour.
2. We feel that the association of these two uncommon neoplasms is more than coincidental and may have a genetic basis.

tumours reported in association with cervical embryonal rhabdomyosarcoma have been of intermediate differentiation.

The presence of collections of cells with bizarre nuclei within the Sertoli–Leydig cell tumour was unusual and initially resulted in consideration of metastatic rhabdomyosarcoma involving the ovarian neoplasm. However, we consider these to represent collections of bizarre nuclei which are occasionally found in otherwise typical ovarian sex cord-stromal neoplasms, including granulosa and Sertoli–Leydig cell tumours.[15] Morphologically these resemble the bizarre cells sometimes found in uterine leiomyomas and are probably degenerative in nature. Focal positivity of the bizarre cells with α inhibin suggested that they were of sex cord derivation. Desmin staining was performed on the ovarian tumour when the possibility of metastatic rhabdomyosarcoma was considered. The Sertoli and Leydig cell components and the bizarre cells were focally positive, and we make the point that ovarian sex cord-stromal tumours may stain with muscle markers, including desmin.[16] Indeed one of us (WGM) has observed that desmin is not uncommonly expressed in ovarian sex cord-stromal tumours. We also mention the fact that collections of bizarre cells are rarely found in otherwise typical cervical embryonal rhabdomyosarcoma.[17 18]

In summary, we report a case in which a cervical embryonal rhabdomyosarcoma and an ovarian Sertoli–Leydig cell tumour of intermediate differentiation coexisted in a 13-year-old girl, the fourth documented example of this association. Given that these are two relatively uncommon neoplasms, we feel that the association is more than coincidental. The basis of the association is not known, but a genetic link seems likely.

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The dangers of dog bites

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This report describes an unusual case of endocarditis caused by *Capnocytophaga canimorsus* as a result of dog bite. The diagnosis could be established only by molecular techniques after amplification of bacterial DNA from the infected cardiac valve. The epidemiology and management of *Capnocytophaga* infections is discussed, as well as the role of prophylactic antibiotics in preventing these infections after dog bites.

A 42-year-old man presented to a district general hospital with a 3-week history of low-grade fever, malaise and breathlessness. Three days before the onset of symptoms his pet dog had bitten his left index finger. The bite wound was washed and dressed, but he did not seek medical advice or receive prophylactic antibiotics. There was no significant medical or surgical history and he was a non-smoker. However, he admitted to alcohol consumption in excess of 30 units of alcohol per week, although liver function tests were normal. On examination, the

Take-home message

Amplification of bacterial 16S rDNA is a useful technique in the diagnosis of culture negative endocarditis.

only findings were a fever of 39℃ and a pansystolic murmur in the aortic area. The bite wound had healed completely. Two sets of BacT/Alert blood cultures were negative, but a transthoracic echocardiogram showed probable vegetations on the aortic valve. He was started on empirical treatment for infective endocarditis with 1.2 g of benzylpenicillin given every 4 h and 80 mg of gentamicin given every 8 h and transferred to a tertiary care centre for further assessment. The transoesophageal echocardiogram showed a para-aortic valvular abscess and the patient underwent emergency aortic valve replacement. No underlying structural abnormalities of the valve were found at surgery. Histology showed florid fibropurulent inflammation of the valve leaflets with disruption of the underlying valvular connective tissue, consistent with infective endocarditis. One further blood culture bottle taken before surgery revealed Gram negative rods on microscopy 24 h after collection. On the basis of these findings, 2 g of ceftriaxone every 12 h was added to the therapy. Despite positive microscopy, none of the organisms could be cultured from either the blood or aortic valve after extended incubation on blood and chocolate agar, probably owing to prior antimicrobial therapy. In view of this, DNA was extracted from valvular tissue and amplified by polymerase chain reaction (PCR) using primers specific for eubacterial 16S rDNA (5′-TTG GAG AGT TTG ATC CTG GCT C and 5′-ACG TCA TCC CCA CCT TCC TC). An amplicon was obtained using DNA extracted from the valve that was sequenced and identified as *Capnocytophaga canimorsus*. 16S rDNA PCR amplification was also attempted on the positive blood culture bottle but was negative. As some strains of *Capnocytophaga* species produce β-lactamases mediating resistance to both penicillin and ceftriaxone, the valvular DNA was also amplified with primers specific for generic TEM and *cfxA* β-lactamase genes. These were not detected by PCR; hence ceftriaxone and gentamicin were continued for another 4 weeks. The patient had an uneventful postoperative recovery and was transferred back to the district general hospital, where antibiotics were continued for a further 2 weeks.

DISCUSSION

C canimorsus is a Gram negative bacillus that is part of the normal oral flora of dogs. It is known to cause severe infections in people who are asplenic and in those using alcohol.[1 2] However, infective endocarditis is rare, with <15 cases in the published literature between 1977 and 2002.[3] *C canimorsus* may require prolonged incubation and specialised medium for isolation, although it is not usually considered a member of the HACEK group of fastidious Gram negative organisms. In this case, the diagnosis was made using 16S rDNA PCR and sequencing performed on the aortic valve. Bacterial 16S rRNA genes contain conserved regions specific to the eubacterial kingdom and regions unique for most bacterial species. Sequence analysis of the variable regions enables accurate identification of bacteria, which can be particularly useful in the investigation of infective endocarditis where blood and tissue cultures may be negative in up to 30% of cases[4] due to prior antimicrobial treatment or the fastidious nature of the organisms involved. The ability to culture *C canimorsus* from blood is also likely to be influenced by the blood culture system. The organism grows poorly on trypticase soy broth; therefore, BacT/Alert paediatric bottles that contain brain–heart infusion as the growth medium may be more effective.[5] Although we were able to amplify *C canimorsus* from the infected valve, attempts to perform this on the positive blood culture bottle were unsuccessful. This is consistent with our experience with this technique as we have only a 40% success rate in amplifying bacterial DNA from positive BacT/Alert blood culture bottles. We postulate that this is due to inhibitors of the PCR reaction in the blood culture medium such as sodium polyanethylsulphonate which copurifies with DNA in column-based extractions. Although penicillins have been most commonly used, the optimal treatment of *C canimorsus* endocarditis is not clear. The organism has been reported to be susceptible to a variety of antibiotics, including penicillin, cephalosporins, macrolides, quinolones and rifampicin. Sensitivity testing is difficult and poorly reproducible, with aminoglycoside susceptibility being a particular problem.[6] Contact with dogs[7] and dog bites are often cited as important factors in the transmission of *C canimorsus*, suggesting that infection might be prevented by the use of antimicrobial prophylaxis. A systematic review on the use of prophylactic antibiotics after dog bites found no effect on preventing wound infections.[8] Interestingly, school age children made up almost 50% of those bitten, yet this is a population in whom *C canimorsus* infection has not been widely reported. By contrast, elderly, alcoholic and asplenic individuals are at greater risk of *C canimorsus* infection and may benefit more from antibiotic prophylaxis, especially after serious bites. Our patient made a full recovery, but required major cardiac surgery and will now need lifelong anticoagulant therapy. Clinicians should be alert to those at increased risk of serious infective complications as a result of dog bites and consider prophylaxis with amoxicillin/clavulanate as recommended in a recent study.[9]

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