Panniculitis is an uncommon skin disease and is the term used for inflammation of the subcutaneous fat tissues (panniculus). It can be infectious or non-infectious in origin. Due to the systemic signs often associated with the skin lesions, a rapid diagnosis followed by specific treatment is desirable (Table 1).

CAUSES OF PANNICULITIS

Infectious panniculitis

Infectious agents implicated in cases of panniculitis include: Actinomyces spp., Actinobacillus lignieresii, Nocardia spp., Mycobacterium spp., saprophytic soil fungi and deep and systemic fungal infections, such as Sporothrix spp., Pythium spp., Blastomyces spp., Cryptococcus spp., Coccidioides spp., Histoplasma spp. and phaeohyphomycosis. However, most of these organisms are rare or not present in the UK. Due to human health implications, mycobacterial infections have to be ruled out in all cases of panniculitis.

Non-infectious panniculitis

A variety of diseases can lead to non-infectious panniculitis, and an idiopathic form has also been recognised (sterile nodular panniculitis). Amongst the conditions implicated are:

- lupus erythematosus
- pancreatic disease
- vasculopathy
- post-injection inflammation
- trauma
- drug-eruption
- vitamin E deficiency (described in cats).

Sterile nodular panniculitis is probably the most common non-infectious form of panniculitis. As many of the organisms implicated in infectious panniculitis are not found in the UK, the idiopathic form is probably the most common type of all cases of panniculitis. Miniature dachshunds seem to be predisposed to sterile nodular panniculitis, suggesting that a genetic background may exist. However, the exact gene responsible has not yet been identified. Miniature poodles and collies may also be over-represented.

CLINICAL PICTURE

The most commonly seen lesions are deep-seated nodules, often accompanied by draining tracts discharging an oily fluid. In dogs, these nodules can be localised or generalised and predominantly seem to affect the trunk, as the panniculus is most pronounced in this area. In cats the subcutaneous masses are most commonly found on the ventral abdomen (in cases of mycobacterial infection), on the dorsal neck (if post-injection reaction is the cause) or the trunk, limbs and abdomen (other aetiology). Systemic signs, including pyrexia, lethargy, anorexia and depression, are often associated with the skin changes. These symptoms often wax and wane with an increase in systemic signs often preceding the development of new skin lesions.

Early and localised lesions are often freely movable under the skin. The nodules can be soft or hard and vary in size. The overlying skin can be normal, yellow, brown or red and often becomes necrotic and ulcerates, forming draining tracts. Alopecia may be present and scar tissue can form, causing permanent alopecia in the affected areas.

Fig. 1: Periocular lesions in a patient suffering from sterile nodular panniculitis.
INVESTIGATION
A thorough history should be taken and the patient should be subjected to an in-depth general and dermatological examination. In-house cytology of discharged fluid can help determine if a primary or secondary (most cases) infection is present. Some of the organisms capable of causing panniculitis may be seen on cytology but, in most cases, histopathology and bacterial and fungal deep tissue culture will be necessary. Fine-needle aspirates of intact lesions will appear oily and inflammatory cells can be found. The inflammation can be granulomatous (only macrophages), pyogranulomatous (neutrophils and macrophages), eosinophilic or lympho-plasma-histiocytic. For cases with suspected underlying diseases, such as pancreatic disease, appropriate blood and other laboratory tests are indicated; however, assessing vitamin E levels is not a helpful parameter. Histopathological samples are best obtained by excisional techniques, as punch biopsies are often not deep enough to reach the affected tissues.

Regardless of the cause, inflammation of the subcutaneous fat looks the same histologically. The inflammatory reaction may be granulomatous, pyogranulomatous, necrotic, eosinophilic or

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**TABLE 1: Panniculitis**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Aetiology</th>
<th>Dermatological Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-rabies vaccination panniculitis</td>
<td>Ischaemic vasculopathy due to idiosyncratic immunologic reaction to rabies antigen targeting blood vessels</td>
<td>Focal alopecia with minimal gross inflammation at injection site</td>
</tr>
<tr>
<td>Post-injection panniculitis</td>
<td>Foreign body and hypersensitivity reaction to vaccine or other injected medications</td>
<td>Solitary subcutaneous nodule at injection site</td>
</tr>
<tr>
<td>Sterile abscess of repositrol injection</td>
<td>Unknown</td>
<td>Solitary, firm subcutaneous nodule at injection site</td>
</tr>
<tr>
<td>Traumatic panniculitis</td>
<td>Focal ischaemia due to blunt trauma, chronic pressure or decreased blood supply</td>
<td>Focal, firm subcutaneous nodule at site of trauma</td>
</tr>
<tr>
<td>Vasculitic panniculitis of thermal burns</td>
<td>Thermal burn with secondary vascular inflammation of the panniculus</td>
<td>Full thickness necrosis of the epidermis and possibly dermis</td>
</tr>
<tr>
<td>Idiopathic sterile nodular panniculitis</td>
<td>Sterile inflammatory panniculitis of unknown aetiology</td>
<td>Multiple, deep, firm-to-fluctuant nodules mainly affecting the trunk that may discharge an oily fluid</td>
</tr>
<tr>
<td>Vasculitic septal panniculitis (subcutaneous leukocytoclastic panniculitis)</td>
<td>Systemic hypersensitivity reaction</td>
<td>Multiple subcutaneous nodules</td>
</tr>
<tr>
<td>Feline pansteatitis (feline vitamin E deficiency, vitamin E deficiency steatitis)</td>
<td>Nutritional diseases due to lack of vitamin E (vitamin E deficient food or excess highly unsaturated fatty acids, e.g. exclusive diet of tinned tuna)</td>
<td>Multiple, irregular firm nodules in subcutis and mesenteric fat</td>
</tr>
<tr>
<td>Metatarsal fistulae (German Shepherd Dog: sterile pedal panniculitis of the German Shepherd Dog, deep metatarsal/metacarpal toritis in German Shepherd Dogs) possibly familial collagen defect</td>
<td>Unknown;</td>
<td>Well demarcated, often symmetric, deep fistulae dorsal to metatarsal/metacarpal pads</td>
</tr>
<tr>
<td>Pancreatic panniculitis</td>
<td>Unknown; possibly due to increased levels of pancreatic enzymes inducing vessel wall damage, enzymes escaping blood vessels, entering fat lobules and inducing necrosis</td>
<td>Localised subcutaneous nodules or ill defined soft tissue swellings that may discharge purulent, oily material, predominantly truncal distribution</td>
</tr>
</tbody>
</table>

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Fig. 2: Lesions on the flank of a patient with sterile nodular panniculitis, showing an oily sanguinous discharge.
lympho-plasma-histiocytic. Infectious agents can sometimes be seen on histopathology, but culture is always indicated to rule out infectious disease. Special stains sometimes help identify potential causative organisms.

If the reaction is primarily lympho-plasma-histiocytic and other clinical signs suggest lupus dermatosis as a possible cause, other diagnostic tests (haematological and biochemical analysis, ANA and direct immunofluorescence) are indicated to confirm the diagnosis.

**TREATMENT**

Therapy should address the underlying disease wherever possible. Solitary nodules can be responsive to surgical removal, however, a recent report suggested that this might not be as successful as previously thought.

If infectious agents have been identified they should be treated with appropriate antimicrobial agents according to their sensitivity pattern. Mycobacteria can be difficult to culture and, if suspected, the laboratory needs to be informed, due to the potential risk to humans. These organisms can sometimes be seen on histopathology and special stains should always be requested (Ziehl-Neelsen for acid-fast bacteria). Some human reference laboratories offer PCR techniques to identify mycobacteria, and samples can be referred to them for identification. Treatment of these cases can be prolonged and expensive and, depending on the organism cultured, might not be desirable, due to the risk the patient may pose to its owners.

**Vitamin E deficiency** can easily be remedied with supplementation or a change of diet. Cases of **pancreatic disease** need supportive care, dietary management and analgesia. **Systemic lupus erythematosus** will need to be treated with aggressive immunosuppressive therapy.

Many cases of **sterile nodular panniculitis** can be cured by glucocorticoid administration (prednisolone at a dose of 1 mg/kg q 24h) until remission is achieved. This can take a few weeks due to the extent of the lesions. The dose frequency is then tapered to every other day and later discontinued. The majority of cases do not relapse, while some go into long-term remission but experience another episode later on. However, a minority needs continued immuno-suppressive therapy and every other day prednisolone, sometimes in combination with azathioprine or ciclosporin A, has been advocated. A recent publication proposed the safe and successful use of a combination of prednisolone and systemic tacrolimus, a calcineurin inhibitor, similar in its mode of action to ciclosporin, for cases not amenable to mono-therapy. If long-term therapy is needed to keep the patient in remission, alternatives to glucocorticoid therapy are desirable and some cases respond favourably to a combination of tetracycline and nicotinamide at standard doses.

**SUMMARY**

Panniculitis is a rare disease that can affect both cats and dogs. Infectious causes are numerous. However, many of the organisms implicated in infectious panniculitis cannot be found in the UK. Due to the systemic signs commonly associated with the skin disease, accurate diagnosis and treatment of the condition is desirable. Some systemic diseases can
cause panniculitis and these need to be identified and addressed. Sterile nodular panniculitis is the most common form and cases often respond well to glucocorticoids, however this condition is unpredictable and relapses are possible.

REFERENCES

FURTHER READING

CPRD
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1. Which organisms have been reported to cause panniculitis:
   d. Mycobacterium spp.

2. What is the name of the idiopathic form of non-infectious panniculitis:
   a. sterile nodular panniculitis
   b. sterile idiopathic panniculitis
   c. idiopathic panniculitis
   d. nodular panniculitis

3. What are the clinical signs of panniculitis:
   a. draining tracts, nodules
   b. pyrexia, lethargy, anorexia, depression
   c. vomiting and diarrhoea
   d. alopecia

4. Which diagnostic tests should be done:
   a. cytology, punch biopsy
   b. culture of discharged fluid
   c. excisional biopsy followed by histopathology and culture of the deep tissue
   d. cytology
   e. blood tests

These multiple choice questions are based on the above text. Answers appear on page 63.

NEWS REVIEW
SPRAY TO WIN WITH TOPICAL STEROID
It could be a ‘win win’ for vets who use the topical corticosteroid Cortavance between now and the end of June. Vets have the chance to win one of five Canon Ixus Cameras worth £150 if they enter Virbac’s Spray to Win game.

Cards are available to anyone and can be obtained from your territory manager; all you have to do is spray the pictured dog to ‘ease’ his pruritus, and answer one simple question. Winning cards will reveal either a camera or a 124 page manual on topical glucocorticoid therapy compiled by a group of the world’s leading dermatologists.

Virbac product manager Chris Geddes MRCVS says the purpose of the campaign is to illustrate the efficacy of Cortavance as the first line treatment for all pruritic and inflammatory skin disorders: “As a potent skin-specific steroid with no detectable harmful effects and competitive pricing, it’s an ideal first line treatment for all atopic dermatitis cases,” he says.

For those who purchase Cortavance, there are also automatic rewards in the form of a clinical handbook on canine dermatology or a didactic atlas on canine dermatoses with 10 bottles purchased - or get both with 15 bottles.

The supply of spray cards is limited, so anyone wishing to obtain a card is advised to contact their Virbac territory manager as soon as possible, or call 01359 243243.

REFERENCE
1. Registration dossier (EMEA Report, scientific discussion available at: www.emea.eu.int/vets/docs/vets/epar/cortavance/cortavance.htm