



Considerations for Hernia Repair in Parrots

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Abstract

Coelomic hernias are commonly seen in middle-aged to older parrots, especially females. Cockatoos, cockatiels and budgerigars are the most commonly affected patients, perhaps reflecting their popularity as pets but also possibly reflecting their reproductive behaviour. Although some of these hernias are congenital, the majority are acquired later in life and are presented to veterinarians for diagnosis and repair. Although this may initially appear to be a simple surgical procedure, the reality is this is a complex procedure requiring the surgeon to consider many facets of the effects of the cause and repair on each individual patient. This paper describes these considerations and suggests solutions to many of the problems presented with coelomic hernia repair.

Introduction

Coelomic herniation is a common problem in parrots. Some, usually umbilical hernias on the ventral midline, are congenital and can be found in any species or sex. The majority are acquired, resulting from a tear or split in the coelomic wall muscles along the ventral midline or in the peri-cloacal region (dorsal, ventral or lateral to the vent). They are most common in middle-aged or older hens that are usually overweight and reproductively active. Cockatoos, cockatiels and budgerigars are over-represented in reports, perhaps reflecting their popularity as pets but also their reproductive proclivity.

On initial assessment many of these hernias appear to be simple surgical problems - reduce the hernia, repair the muscle deficit, and the problem is solved. Unfortunately this is rarely the case; hernia repair surgeries can be complex and can result in unexpected morbidity and mortality. Each case has to be approached individually, and the clinician has to consider many facets of the cause, treatment, and likely outcomes before developing a treatment plan. This paper discusses many of these considerations and suggests solutions to the problems that a hernia repair presents to the clinician.

Aetiology

Coelomic hernias can be congenital or acquired.

Congenital hernias can occur in any species and any sex, and are usually present at hatch or develop soon after. They result from either a failure of the linea alba to close completely at the umbilicus after the yolk sac has been internalised, or from a deficit in the muscle itself.

Acquired hernias most commonly develop in older hens that are usually overweight and reproductively active. These hernias are the result of the muscle wall splitting, allowing the coelomic contents to herniate through the split while remaining under the skin. The cause of this muscle split is a combination of increased coelomic pressure and muscle atrophy. The increase in coelomic pressure in an overweight hen occurs when the coelom, already under pressure from coelomic fat, is subjected to pressure increases arising from organ enlargement e.g. hepatomegaly (Langlois and Jones, 2001), ovarian follicles and/or cysts, and oviductal enlargement (MacWhirter, 1994).

Muscular atrophy is a function of age and lack of physical fitness. It was once thought that high oestrogen may cause muscular thinning and weakness, but this theory does not explain why post-menopausal women develop muscular atrophy; nor does it explain why these women will regain their muscle strength after receiving hormone replacement therapy. It seems likely that oestrogen is needed to maintain muscular strength (Lowe et al., 2010), and that progesterone may moderate this strength (Greeves et al., 1997). Further work is needed to elucidate these findings in birds, but at the moment it seems unlikely that the high levels of oestrogen in a reproductively active hen will cause muscle weakness. It will, however, stimulate ovarian development and oviductal enlargement, increasing intra-coelomic pressure.

Herniated tissues, encased in peritoneum, will usually remain subcutaneous unless the hernia is subjected to trauma, either self-inflicted or accidental. The skin overlying the hernia will often stretch and become thin, but may also develop a thick covering of xanthomatous tis-

sue. This xanthoma may become avascular and necrotic, leading to blood loss, auto-mutilation and potentially evisceration.

Considerations

- a. Large amounts of coelomic fat are often present in birds with acquired hernias
- b. There is usually some degree of organomegaly - either hepatomegaly or reproductive tissue
- c. There may be varying degrees of muscle wall atrophy present, which may prevent primary closure of the muscle split
- d. Xanthomatous skin may present surgical difficulties when closing

Possible solutions

- a. Unless the overlying skin is ulcerated or there is organ entrapment present, hernia repair is rarely an emergency
- b. Converting the bird to a formulated diet and reducing its weight will decrease liver size in many cases and shrink the amount of coelomic fat, thereby reducing much of the intra-coelomic pressure
- c. The use of GnRH agonists such as deslorelin implants or leuprolide acetate may reduce the size of the reproductive tract, again reducing intra-coelomic pressure
- d. The improved diet and reduction in the size of the hernia may improve the xanthomatous skin. The addition of Omega 3 & 6 essential fatty acids to the diet may lower blood cholesterol and further improve the skin integrity.

Treatment

While the surgical reduction and repair of a hernia remains the mainstay of treatment, before undertaking such a surgery there are number of facets to consider. Firstly, surgical repair should be delayed (if possible) until the causative factors have been identified and, if possible, remedied. This may take three to six months before the patient is ready for surgery.

The next consideration is the effect of reduction of the hernia, anecdotally regarded as the most dangerous part of the surgery. It appears that at this time, more than any other, the patient is likely to experience severe dyspnoea or cardiovascular changes that can result in death if not recognised early. The dyspnoea is most likely due to compression of the air sacs by the newly-returned viscera. Respiratory rate decreases and the depth increases as the patient attempts to ventilate. If the compressive pressure is not reduced quickly, death can ensue. The cardiovascular abnormalities may be the result of what is now known in human and small animal surgery as 'abdominal compartment syndrome' (Joubert, 2006), where

the increase in intra-coelomic pressure associated with hernia reduction reduces venous return via the caudal vena cava, leading to decreased cardiac output, hypotension, and arrhythmias. If this is not identified, death can rapidly ensue.

Other complications include: adhesions between the intestinal serosa and the skin or muscle wall which have to be broken down carefully and gently to avoid iatrogenic intestinal perforation or ileus; widespread muscle atrophy and/or retraction preventing primary closure of the deficit; and the integrity of the skin that may have thinned or become xanthomatous. Finally, as with any other surgery, the concurrent presence of anaemia, liver disease, renal insufficiency or other systemic illnesses may lead to anaesthetic and surgical complications.

Considerations

- a. The hernia may not be the bird's only health problem
- b. There is a moderate to high risk of compressing the air sacs leading to dyspnoea and respiratory arrest
- c. There is a moderate to high risk of triggering abdominal compartment syndrome leading to a catastrophic hypotension and subsequent cardiac arrest
- d. It may not be feasible to achieve primary closure of the muscle split without severely compressing the coelom and causing dyspnoea and/or hypotension
- e. Iatrogenic intestinal perforation may occur if the intestinal serosa is adhered to the skin or muscle wall
- f. Skin closure may be problematic if ulceration or xanthoma is present.

Solutions

- a. Ensure pre-operative haematology and biochemical analysis is performed with sufficient lead time to identify and remedy other disease problems
- b. Ultrasound the hernia to determine if intestinal loops are present in the hernia
- c. If possible, perform a salpingohysterectomy and remove some of the coelomic fat during the procedure. This will create more 'space' in the coelom and reduce the risks of air sac compression and abdominal compartment syndrome
- d. Consider the use of surgical mesh to assist in closing the muscle deficit and reducing intra-coelomic pressure
- e. Plan the skin incision before starting to ensure there is sufficient viable skin to achieve primary closure without excessive tension.

Prognosis

The short-term prognosis of hernia repair is good, so long as causative factors have been identified and remedied and the surgical plan minimises the risks associated with the reduction and repair.

The long-term prognosis is more guarded, as recurrence is not uncommon. If reproductive activity continues there is the added risk of yolk-related peritonitis developing.

Considerations

- a. Recurrence is usually associated with a weight gain or with renewal of reproductive activity
- b. Subsequent reductions and repairs may be more difficult, as scarring and adhesions may limit the surgical field.
- c. Yolk-related peritonitis may be a long-term complication if a salpingohysterectomy is performed.

Solutions

- a. Owner education and compliance is vital in preventing recurrence.
- b. The patient's diet must be strictly maintained to minimise weight gain, which must be monitored carefully on annual (or more frequent) health checks
- c. A salpingohysterectomy is recommended as part of the surgery but is not always feasible at the time. Even if performed, it is common for ovarian activity to renew and continue. This can result in follicular development, yolk-related peritonitis, and recurrence of the hernia. The ongoing use of GnRH agonists and careful monitoring, as well as owner education and compliance over the induction of reproductive activity, is strongly recommended.

Conclusion

The open reduction and repair of hernias in parrots is not a simple procedure. The clinician must evaluate both the patient and the hernia, identifying potential complications and means of minimising or preventing their effect. By doing so, the chances of a successful outcome in both the short and long term are increased.

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