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RADIOGRAPHIC DIAGNOSIS AND SURGICAL TREATMENT OF EGG IMPACTION IN A LAYING BIRD

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ABSTRACT

Aim: The objective of this study was to present the use of radiography to diagnose and surgery for the treatment of egg impaction in the avian. Design: Clinical case study. History: An intact 64 weeks old Zartec layer bird weighing 1.5 kg was presented at the Veterinary Teaching Hospital, Michael Okpara University of Agriculture, Umudike with a complaint of cloacal prolapse, straining, dullness, and inappetence. Clinical examination: Cloacal examination revealed the presence of a big sized egg that could not be harvested by digital extraction. Ventrodorsal radiography of the bird confirmed the diagnosis of impaction due to over-sized egg. Surgery: A midline abdominal incision was made to relieve the impaction. The surgical wound was cleaned and routinely approximated. Results: The surgical intervention was successful and the bird recovered and resumed egg lay three weeks post-surgery. Conclusion: It was concluded that radiography could be used to infirm while surgical intervention may be an effective means of treating egg impaction in the avian. Clinical Relevance: The present report demonstrates the potential use of surgery in the treatment of egg binding in a laying domestic chicken. This treatment may be extrapolated to highly priced breeder birds, ornamental and endangered avian species diagnosed of egg impaction.

Keywords: Radiographic diagnosis, Egg Impaction, Treatment, Laying bird.

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INTRODUCTION

Egg impaction also known as egg binding refers to a very serious condition in avians and reptiles in which a fully formed egg takes longer than usual to pass out of the reproductive tract, as a result of obstructed oviposition. The egg may be lodged near the cloaca, or further inside in the shell gland (uterus) or oviduct. Egg binding is a common life threatening condition that can cause severe damage to internal tissues, haemorrhage, and prolapse of the oviduct, usually along with the cloaca, infection, and death may occur as a result of dystocia [1,2,3,4,5].

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Clinical signs of egg impaction include disinterest in feeding and drinking, decreased activity, pengiun posture, abdominal straining, watery diarrhoea or coprostasis with full crop; the hen is droopy and depressed, pale comb and wattles, hard abdomen, repeated failed attempt to lay within 24 hours, drop in egg production, etc. Failure to lay for a day or even a few days is not necessarily due to egg-binding. Occasionally, a laying bird may take a break from laying in response to seasonal changes (a hot spell, over-stimulation of birds by increasing intensity of light and day-length, or a cold snap) and molting [5].

Causes of egg-bound include environmental stressors such as adverse temperature changes, improper husbandry, hormonal imbalances (producing weak contractions) and calcium tetany, hypocalcaemia (calcium plays a role in oviduct and uterine contractions necessary for egg expulsion), other nutritional issues (e.g. rapid increases in the amount of feed and or excessive proteins – lysine, dehydration, etc), and obesity or hens that are over-weight. Egg-bound may also result from inflammation of the oviduct, partial paralysis of the muscles of the oviduct, or malformations like the production of an egg so large (e.g. double-yolked) that it is physically impossible for it to be laid.

Factors that predispose to egg impaction include breeding pullets that are premature or too small, not providing laying nest (leading to deliberate retention of eggs), calcium deficiency, and over-feeding of species in which clutch size is dependent on feed intake as in veiled chameleon, oviduct infection, previous trauma (usually pecking in avian) to the vent and or vagina. Young pullets laying excessively large eggs are more prone to the egg binding [1,2,4,5,6].

Impaction of eggs may be an important ecological device used to limit clutch size, as lizards that lay fewer but larger eggs are more predisposed to bound-egg anomaly. For example, the risk of egg binding in the common side-blotched female lizard that yields less than the average 4-5 eggs in a clutch is significantly high [6].

Egg binding is a medical emergency in pet birds and farm animals. Egg impaction is common in commercial layers, especially broiler breeder layers and usually diagnosed during postmortem examination [5,7]. In reptiles, egg binding is potentially fatal if not treated quickly. Therefore, immediate medical attention should be given to any gravid female that became very lethargic and anorectic in order to treat the life-threatening condition [3]. When binding occurs in poultry, subsequent developing eggs form layers of albumen and yolk materials making the oviduct very large. Occasionally, bound eggs are refluxed to the abdomen (abdominal laying) altering the gait of the hen into a penguin-like posture [5].

CASE REPORT

A poultry farmer presented two laying birds to the Veterinary Teaching Hospital of the Michael Okpara University of Agriculture, Umudike (VTH-MOUAU) with the complaint that the birds had protruding anuses. The farmer said he had 550 layers aged 64 weeks that started laying eggs at 32 weeks. The birds had received all the routine vaccinations and never come down with any disease outbreak except for the present drop in egg lay. They were housed in a deep litter system and fed commercial poultry feed (Top Feeds, Eatern Premier Feed Mills Ltd,. Uyo, Nigeria).

On physical examination, the two birds (with average body weight of 1.5 kg) were alert with different degrees of cloacal prolapses. Their combs and wattles were pale and depressed. An egg was visible externally in the cloaca of one of the birds. Digital exploration using gloved hand lubricated with K-Y Jelly revealed the presence of an egg in the oviduct of the other layer. The "cloacal egg" was removed by manual traction while the one stuck in the second patient defiled all attempts at digital extraction. The second bird was referred to the imaging unit of the hospital where a lateral abdominal projection of the layer was obtained revealing three oval structures of varying opacities in the abdominal cavity of the bird.

A diagnosis of egg impaction was reached based on clinical signs, adequate history, physical examination (Nipane and Kumare, 2011), and confirmed by radiography (Fig. 1).

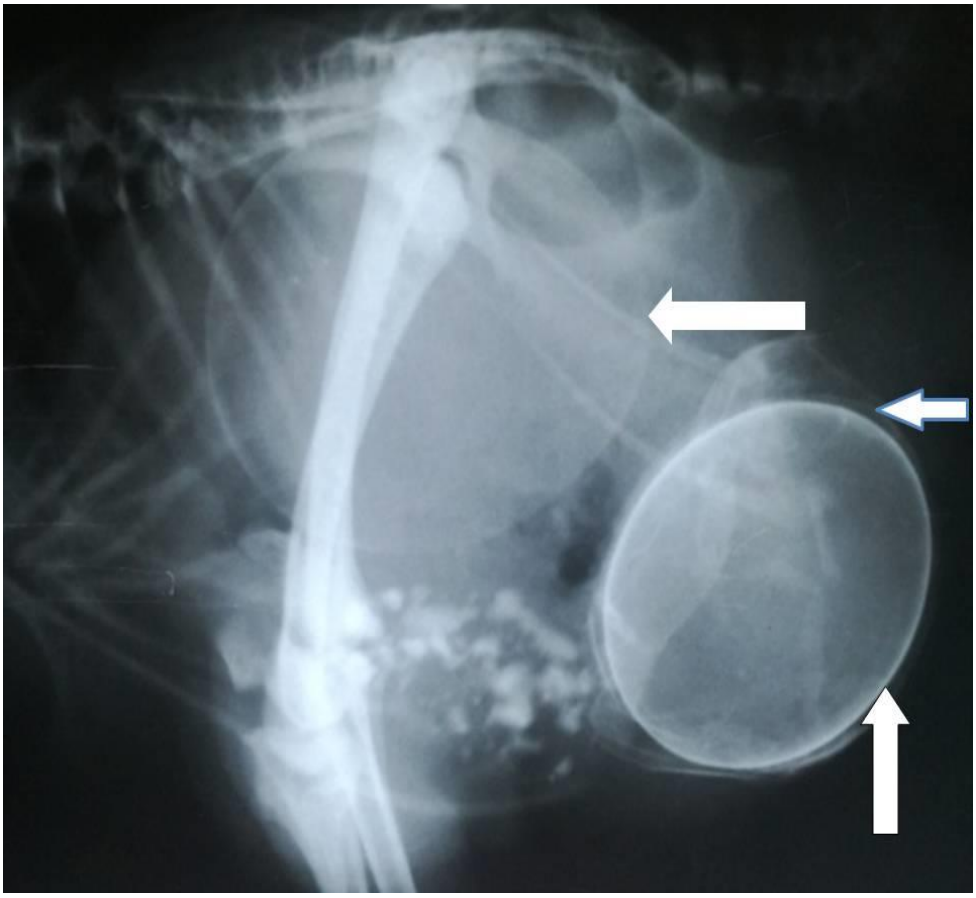

Figure 1: Lateral abdominal projection of the patient showing a very large incompletely mineralized ductal egg (long horizontal arrow) and shell fragments of impacted but resorbed egg (short horizontal arrow) encasing the cloacal denser, big-sized egg (vertical arrow).

SURGICAL TREATMENT

The patient was prepared for surgery by de-feathering and cleaning the abdomen with soapy water and antiseptic solution (50% ethyl alcohol). The bird was controlled manually in dorsal recumbency and restrained with halothane (Halothane-Pharco®, Alexandria) soaked in cotton wool using an improvised face-mask. Surgical approach adopted was ventral abdominal midline incision cutting through the skin, subcutaneous tissues, and the muscles into the abdominal

cavity. The oviduct was identified and incision made into it at the point of impaction. A fully formed medium-sized egg was seen trapped within the shell of a large egg, partially resorbed for inability to pass through the oviduct. Also, a second, larger but non-mineralized egg was extracted from the oviduct. The three sequential eggs were exteriorized from the oviduct; at which point the oldest egg that caused the obstruction was no longer intact but broken and collapsed (containing cheesy materials) into which the second but normal egg had lodged. The third egg was clearly the largest in size but was soft and inadequately mineralized and located in the shell gland. The cheesy content of the oldest resorbing egg shell was swabbed for bacterial culture and sensitivity. The authors determined from the alertness of the birds on presentation and the nature of the bound eggs that the impaction had lasted beyond 72 hours before presentation at the clinic.

The incision on the oviduct was closed with size 2/0 catgut in a Lembert inverting style. The skin, subcutaneous tissues, and the muscles were approximated using 2/0 nylon horizontal mattress sutures. The surgical wound was cleaned with sterile gauze soaked in antiseptic and covered topically with oxytetracycline spray (Oxytetravet aerosol®, The Arab Pesticides and Veterinary Drugs Manufacturing Co., Jordan). Postoperatively, the patient was placed on long acting oxytetracycline (Oxytetra 200 LA®, Pantex, Holland) at 20 mg/kg and diclofenac sodium (Dicloecnu Injection®, Ecnu Pharmaceutical, China) given at 1 mg/kg s.i.d. x 3/7. The two drugs were given intramuscularly while food and water were provided *ad libitum*. The nylon sutures were removed 12 days later following wound healing.

Figures 2: (a) Showing the patient, (b) the animal ready for surgery, (c) operation in progress revealing a normal egg [arrow], (d) whorl-like fragment of bound egg [arrow], (e) three recovered eggs: an egg fragment, a normal egg, and an over-sized soft-shelled egg [arrow], (f) and (g) abdominal closure and wound dressing, respectively [arrows], (h) and resumption of egg-lay, evidenced by a newly laid egg (arrow).

Treatment Outcome: The hen recovered fully and resumed egg laying three weeks post-surgery.

Microbial Examination

The swb sample was inocstreaked on the laboratory sample was inoculated on nutrient agar using a modified streaking method and incubated at 37^0C for 24 hours [8]. Microscopy at x1000 magnification revealed a scanty colony of facultative slow-growing gram positive coccal organism arranged in pockets, suggestive of *Peptostreptococcus petridius*. There was no growth of the organism on MacConkey agar and when cultured under aerobic condition.

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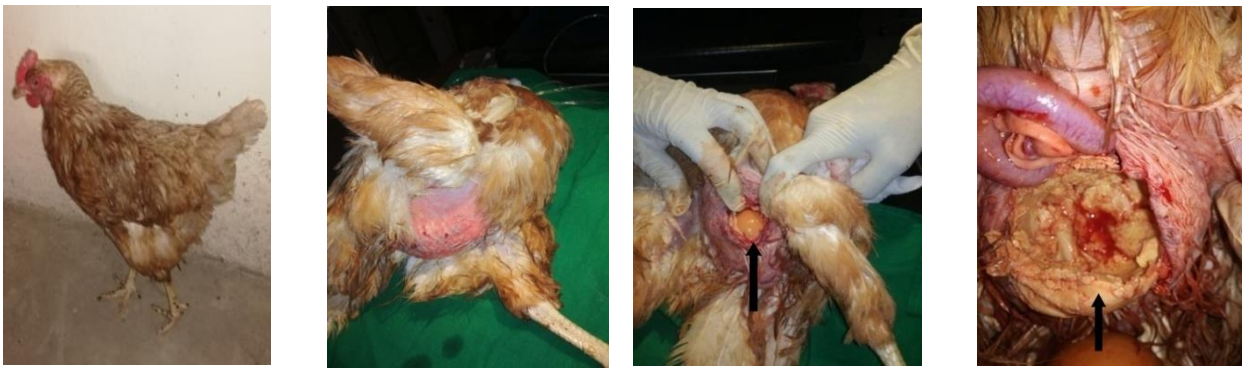
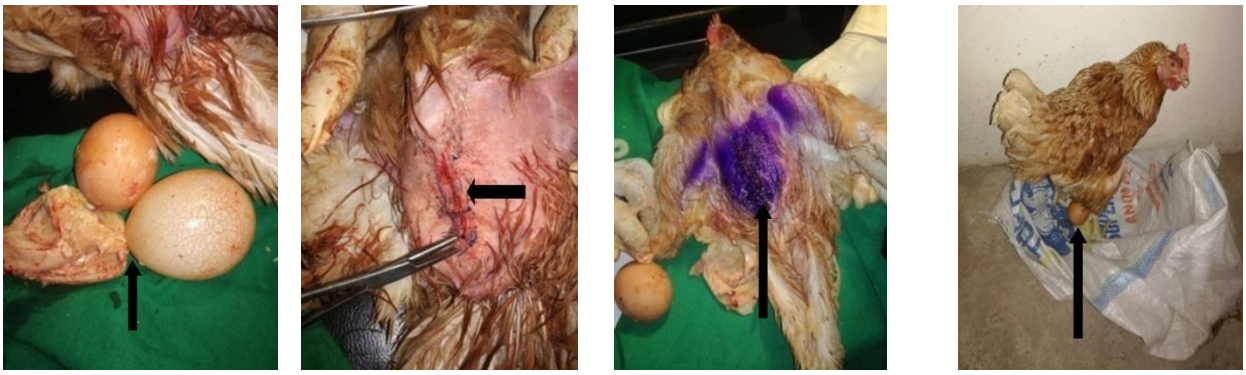


(a) (b) (c) (d)



(e) (f) (g) (h)

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DISCUSSION

A stuck egg may be gently manipulated and massaged out, as was the case with one of the patients. Stucked eggs may also be broken in situ if manipulation fails, followed by cleaning the oviduct of shell fragments and egg residue. The later treatment is associated with trauma and infection of the reproductive tract, and should be done carefully. Several other methods have advocated for manipulating or assisting the hen to lay the bound egg [3,9].

However, some cases of egg binding must undergo surgical intervention [3,9]. In the present case, manipulation failed and syringing was not a good treatment option because of the involvement of three eggs in the impaction; one of the eggs being high up in the reproductive tract and inaccessible for massage and needle point extraction. Surgery was therefore conducted using a ventral midline incision. Three sequential eggs were exteriorized from the oviduct: the oldest egg that caused the obstruction was no longer intact but broken and collapsed (containing cheesy materials) into which the second but normal egg had lodged. The third egg was clearly the largest in size but soft and inadequately mineralized, located in the shell gland. The authors determined from the alertness of the birds on presentation and the nature of the bound eggs that the impaction had lasted beyond 72 hours before the the operation.

Therefore, surgical intervention appears to be economically wise and recommended in all cases where recovery of bound eggs cannot be achieved by manipulation, especially in commercial layers, the endangered avian species (becoming extinct), highly priced, ornamental, pet and breeder birds in order not to lose such species, or their stuck eggs. Surgical treatment will preserve and enable the hens to continue their reproductive lives. Radiography using abdominal lateral, ventrodorsal or dorsoventral view (depending on whether the patient is an avian or a reptile) or any other imaging method is very necessary for accurate diagnosis of egg impaction with respect to the location(s), number, size(s) of bound eggs, and other associated lesion(s).

Microbiological study of the laboratory sample involving nutrient agar anaerobic culture showed a scanty colony of facultative slow-growing gram-positive cocci organism arranged in pockets, called *Peptostreptococcus petridius*. There was no growth on MacConkey agar and also when it was cultured under aerobic condition. Since the organism, *Peptostreptococcus petridius*, is a normal commensal organism in animals, living predominantly in the mouth, skin, gastrointestinal tracts, vagina and reproductive tracts, and are members of the gut microbiota. Under immunosuppressed or traumatic conditions, these organisim can become pathogenic as well as septicaemic and injurious to the host. The organism can cause, among other lesions, generalized necrotizing soft tissue infections and may be incriminated in the case being reviewed. *Peptostreptococcus* species found in clinical infections, were once part of the genus formerly known as *Peptococcus*. *Peptostreptococcus* is the only genus among anaerobic gram-positive cocci that is encountered in clinical infections and so viewed as being clinically significant anaerobic cocci [9]. *Peptostreptococcus* species participates in mixed anaerobic infections [4,6] occurring more often in chronic diseases; and the slow growth of the organism makes it increasingly resistant to antimicrobials [9]. However, the organism is susceptible to beta lactam antibiotics [10,11,12,13,14].

Egg bound is of serious economic importance in the poultry industry in terms of diminished production due to egg losses, vent pecking, cannibalism, morbidity, mortality, and other associated disease conditions such as egg peritonitis and salpingitis. The outcome of this case demonstrates the potential usefulness of surgery radiographic diagnosis and surgery in the treatment of egg binding in a laying domestic chicken. Consequently, this treatment may be extrapolated to highly priced breeder birds, ornamental and endangered avian species diagnosed of egg impaction.

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