

# Proventricular–Ventricular Impaction in two ostrich chicks (*Struthio camelus*)

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Received 23rd September, 2016; Accepted 6th November, 2016

**ABSTRACT:** Impaction of the proventriculus and ventriculus due to ingestion of stones, wood, ceramic tiles, metal spoons and plastic materials was confirmed at postmortem examination in two ostrich chicks (*Struthio camelus*) aged 8-months and 4-months from two flocks in Gwagwalada and Lugbe in Abuja, Nigeria respectively. Both cases were presented to the Veterinary Teaching Hospital (VTH) of University of Abuja (U.A.) in November, 2014 (first case) and in May 2016 (second case) with pale mucous membranes, sternal recumbency, outstretched neck, ruffled feathers, dehydration and emaciation. Abdominal palpation in both cases revealed firm and gritty sensations. Antibiotic (oxytetracycline) long acting, Vitamin B-complex and 5% Dextrose saline therapy was instituted in both cases. However, both ostriches later died and were autopsied. The post-mortem revealed impaction of the proventriculus and ventriculus with foreign bodies (such as stones and sand, spoons, wood fragments and ceramic tiles). In addition, there was thickened mucosa of the proventriculus with ulcers, hydropericardium, petechiae on mucosal and serosal surfaces of cervical part of the trachea in the first case; while the second case had petechiae in the mucosa of the duodenum. Proventricular-ventricular foreign body impaction was diagnosed as the cause of death in both ostrich chicks.

**Key words:** Bodies, foreign, ostrich, impaction proventriculus, ventriculus.

## INTRODUCTION

Ostriches like any other poultry do not have teeth for chewing. They have a flat and broad beak for grasping or picking food and the tongue function as a prehensile organ and aids in swallowing feed. Thus, the birds require grits or other forms of particles with the aid of which the powerful ventriculus or gizzard musculature compress and break down feed into smaller particles for easy digestion and assimilation.

Ostriches are famous for curiosity and special attraction to bright and colourful materials (Zakeri and Kashefi, 2011), some of which they ingest. Swallowing of such foreign bodies can cause serious damage to birds depending on the size, hardness and sharpness of the

edges of the swallowed or ingested objects (Zakeri and Kashefi, 2011).

External or foreign materials that are swallowed by ostriches include wood fragments, plastics, ceramics, metals and gravels or stones present in their vicinity. Plastic materials were said to be more dangerous than wood fragments or gravels (Zakeri and Kashefi, 2011) because the gizzard muscular action or pressure cannot reduce the size of the plastics or digest them. Ostriches of any age group are prone to the problem but the damage appears to be more common and severe in juveniles of about 4 to 6 months of age (Honnas et al., 1991; Mushi et al., 1998).

Ostrich farming is becoming popular in Nigeria among the elite class and therefore any information on nutritional complication of keeping ostrich will go a long way to encourage their sustainable farming; hence, the need for this report.

## CASE HISTORY/CLINICAL SIGNS

### Case Report 1

On November 7th, 2014, an 8 months old ostrich (*Struthio camelus*) was presented to the Avian Unit of the VTH of Faculty of Veterinary Medicine (FVM), U.A., with a complaint of complete anorexia of more than one week duration.

Further interrogation revealed that the ostrich was housed in an open-sided wire mesh and zinc-roofed house with concrete floor and fed on spinach leaves, maize offal (dusa) and growers mash (Vital feed®) for chicken and that it had been treated previously by a veterinarian when the condition was first noticed.

Vital parameters recorded by the veterinarian then were: body weight of 45kg, rectal temperature of 40.2°C, mild dehydration and pale ocular mucous membranes of the conjunctiva. The treatment given then was 5% oxytetracycline (250mg/kg) intramuscularly, vitamin B-complex (5ml intramuscular) and 5% dextrose saline (500ml intravenously), each for three consecutive days, followed by ivermectin (0.3mg/kg subcutaneously).

The ostrich chick was then referred to the VTH as there was no sign of improvement in its health following this treatment.

### Clinical Examination

Physical examination of the ostrich at the VTH revealed a body temperature of 40°C, pale ocular mucous membranes, severe emaciation, sternal recumbency, whitish watery faeces and a firm solid mass on palpation of the abdomen. The plan of action was to collect blood and faecal samples for laboratory examination (microbiology and parasitology) and to carry out abdominal radiography. However, the ostrich died before these could be done and post-mortem examination was carried out on the carcass (first case).

### Case Report 2

On May 7th, 2016, a client presented the carcass of a 4 months old ostrich chick which died the previous day with a complaint that an ostrich chick had died previously on the farm and that two other ostriches were not eating and unable to stand or walk. Clinical examination of the

remaining two ostriches that were subsequently brought to the VTH revealed: rectal temperature of 38.9 and 40°C, respiration of 53/min., pale ocular mucous membranes, general weakness, sternal recumbency, outstretched necks, dyspnea, ruffled feathers, dehydration, emaciation, whitish watery faeces and inability of the birds to stand on its own without support.

A visit to the farm revealed that the ostriches were fenced in an open space with wire mesh and fed on spinach leaves and growers mash (Vital feed®) for chicken. Post mortem examination was recommended on the dead ostrich chick.

### Diagnostic Plan

The diagnostic plan was to collect blood and faecal samples for microbiology and parasitology laboratory analysis. A visit to and inspection of the farm was proposed. Blood and faecal samples could not be collected from the ostriches because there was no rectal faecal material and the blood vessels (right and left jugular and wing veins) were acutely collapsed due to dehydration of the birds. A tentative diagnosis of proventricular-ventricular impaction was made.

### Post-Mortem Examination (second case)

A postmortem examination was conducted on the dead ostrich chick and the gross lesions observed were recorded.

## RESULTS

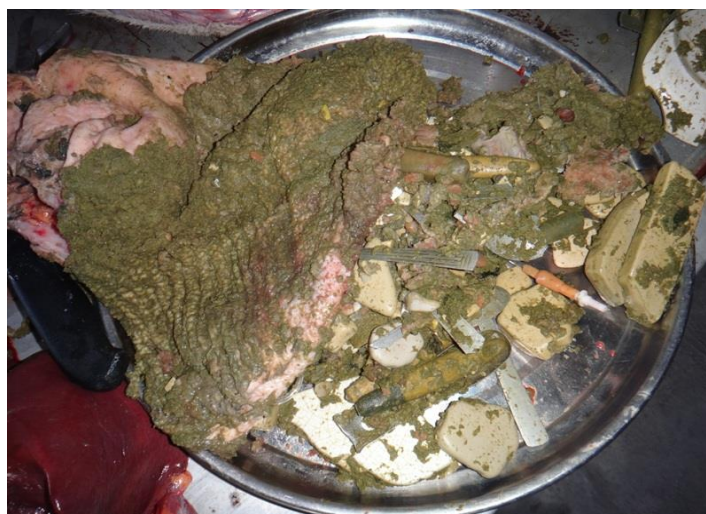
### Gross Pathology

In the first case, there were wood fragments, metallic spoons, ceramic tiles, stones and sand weighing 2.3kg in the proventriculus and ventriculus (Figures 1 and 2). Other lesions included pale ocular mucous membranes, hydropericardium, straw-coloured hydroperitoneum, petechial haemorrhages on the mucosa and serosa of cervical part of the trachea, enlarged and congested liver and thickened mucosa of the proventriculus with multiple ulcers. The left kidney was markedly congested and the right kidney was soft and haemorrhagic.

The second case showed severe emaciation, pale ocular mucous membranes, congestion of the trachea, thickened thoracic and abdominal air sacs, congestion of the kidneys, foreign bodies (mainly fragments of wood, some measuring up to: 3 cm x 1 cm and ceramic tiles: 1.5 cm x 1 cm) mixed with sand in the proventriculus while the ventriculus was filled with sand and small stones (Figures 3 and 4). The mucosa of the duodenum had petechial haemorrhages.



**Figure 1.** Foreign bodies (wood, ceramic tile and plastic spoon handles) in proventriculus of an 8-months old ostrich (*Struthio camelus*).



**Figure 2.** Wood, ceramic tiles, metals and spoons removed from proventriculus and ventriculus of an 8 month old ostrich (*Struthio camelus*).

### Medical treatment

Medical treatment given to the two live ostriches included 250mg/kg of oxytetracycline long acting intramuscularly against secondary bacterial infection, vitamin B-complex (2 ml intramuscularly) to stimulate appetite and 5% dextrose saline (500 ml subcutaneously) as a means of rehydration and source of energy. These treatments were repeated after three days as the ostriches were able to stand on their own and feed after the first treatment. The

two treated ostriches recovered fully after three consecutive treatments using this regimen and were discharged to the owner on the tenth day following initial presentation.

### DISCUSSION

The result of farm visit revealed that the ostriches were confined in a pen with unkempt surroundings full of



**Figure 3.** Wood, sand and stones in proventriculus of 4-month old ostrich (*Struthio camelus*).



**Figure 4.** Foreign bodies (wood and ceramic tile removed from the proventriculus and ventriculus in Figure 3).

stones, broken ceramic tiles and plastic materials. This was a ready source of foreign bodies and source of stress to the birds (Carbajo, 2007). Poultry (birds) under confinement in a deep litter floor housing system with free access to stones, sand, rope, straw, wires, nails and other forms of hardware or foreign materials are prone to gizzard impaction., gastric stasis and perforation of the gastro-intestinal tract by sharp objects (Samson, 1996). This observation is particularly true for ostriches raised in such environments as noticed in the farm visited in the second case and as reported by other authors (Komnenou et al., 2003; Long et al., 2009). The post mortem findings in the two dead cases were identical to

those reported by Mendonça et al. (2010) and Nagarajan et al. (2011) in cases of proventriculus and ventricular impaction in ostriches. Proventricular and ventricular impaction is the commonest health problem and the most life-threatening clinical condition in ostriches, especially young ones (Stomach, 1992). This is because various stress factors, disorders of nutrition (or imbalance) and behavioral changes can make ostriches develop pica (Honnas et al., 1991; Komnenou et al., 2003) particularly in young birds (Komnenou et al., 2003). Although, such foreign bodies may act as grit and aid digestion, they later became a problem when the amounts ingested are too much or the ingesta are too large as to completely

occlude the proventriculus and ventriculus.

Although a detailed farm history and findings from physical examination may be sufficient information to enable making of a correct diagnosis, a radiological examination and/or ultrasonography may be necessary for diagnosing mild cases and to identify the nature of the ingesta. Attempts to remove such harmful objects or relieve foreign body impaction by surgical means (proventriculotomy) have been reported with fair to good outcomes depending on how quickly cases requiring such management are treated (Gamble and Honnas, 1993).

Treatment with liquid paraffin (100 ml/kg) as laxative, intravenous 5% dextrose saline or lactated ringers solution (50 ml/kg), oxytetracycline (1 ml/kg) and vitamin B-complex to stimulate appetite may be given in mild or moderately severe cases based on the clinical and radiological findings. Cases not responding to such medical treatment should undergo immediate surgical intervention. Possibly, the positive response to medical treatment in our case may be attributed to the mild nature of the impaction unlike in those chicks that died.

This condition may be prevented if birds are reared in environments free from large and potentially dangerous foreign bodies. Boredom/stress should be minimal and nutrition optimal.

## Conclusion

Proventricular-ventricular impaction was the cause of the recorded deaths in both ostrich chicks. It is recommended that for efficient diagnosis and management of foreign body impaction in animals and poultry such as ostrich, a radiographic facility should be readily available and where proventriculotomy is adjudged as the most appropriate mode of therapy it should be conducted without undue delays.

## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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