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Liposarcoma in a Common Quail (*Coturnix coturnix*): A Case Report

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ABSTRACT

Introduction: Liposarcoma is a rare malignant soft tissue tumour and it has only been occasionally reported in birds such as goose, parrot and falcon. We present a case of unusual liposarcoma located near the uropygial gland in 2-year-old female common quail (*Coturnix coturnix*). Such cases are rarely documented, emphasizing the importance of understanding their clinical presentation, diagnosis and management.

Case Presentation: A 2-year-old female common quail was presented for a veterinary examination because of an abdominal mass that the owner reported grew quickly. The mass recurred within 3 months despite surgical excision in another clinic before, and prompted a secondary assessment. Examination of the prodorsal region revealed a firm, subcutaneous mass. Blood tests were indicative of an inflammatory response with increased neutrophils and a decrease in lymphocytes, while biochemical profiles showed signs of the hypoproteinaemia with low albumin levels and a hypocalcaemia–all likely secondary to the chronic burden associated with the tumour. Necropsy and histopathology identified a 3.5 cm liposarcoma of neoplastic, lipid-rich cells with well-defined morphological characteristics, including polygonal forms and fibrovascular stroma. The diagnosis of a well-differentiated liposarcoma was confirmed with immunohistochemical staining for Vimentin and S-100 markers.

Conclusion: Management of liposarcomas in avian patients is often difficult, due to limited established treatments for liposarcomas in avian cases; surgical excision remains the primary approach despite high recurrence rates. This case highlights the value of histopathology and immunohistochemistry as tools to distinguish between liposarcoma and other similar lesions in birds; additionally, it emphasizes the need for more investigation to develop successful therapeutic protocols in avian oncology.

1 | Introduction

Neoplastic conditions are frequently identified in pet birds, with those of the Psittaciformes order being particularly prone to such diseases. Miscellaneous liposarcomas have been reported very sporadically among avian species, including those in a goose, monk parakeet, budgerigar, African grey parrot, partridge, cockatiel, pigeon and falcon (Zehnder et al. 2016; Graham et al. 2003; TN et al. 1994; Schmidt 1992; Doster et al. 1987; Rahim et al. 2018; Castro et al. 2016).

The skin and soft tissue mesenchymal tumours include a variety of neoplasms such as lipomas, liposarcomas, myelolipomas, fibromas, fibrosarcomas haemangioma, fibromyoma and

myxosarcoma and for the first three; lipid accumulation has been found within the tumour. In contrast, other types of neoplasia such as lymphoma, adenocarcinoma and squamous cell carcinoma are more commonly observed in pet birds (Reavill and Schmidt 2000; Blakey et al. 2018).

Liposarcomas represent the malignant counterpart of lipomas, and they are typically well-defined but firm infiltrating yellow-to-grey vascular subcutaneous masses. These tumours are most commonly located in the carpus, neck (subcutaneous tissue), uropygial gland, digits and abdominal cavity. Overall prognosis is often poor due to the local invasiveness and metastatic propensity of liposarcomas, which behave aggressively. In most cases surgical removal is the treatment of choice; however, there are no established protocols for chemotherapy or radiotherapy in birds yet (Hendrick 2016; Turrel et al. 1987; Enomoto et al. 2022).

In this case report, we report an atypical case of liposarcoma near the uropygial gland in an adult 2-year-old common quail. The goal of this report is to describe the clinical presentation, approach to diagnosis and pathology associated with such a rare condition.

2 | Case Presentation/Report

A 2-year-old female common quail (*Coturnix coturnix*) was presented with an owner's observation of rapidly growing abdominal mass, located below the pelvic bone area, first noted by the owner in April 2024. The case had previously been treated including the surgical removal of the mass at a different clinic however in July 2024 the mass reappeared again.

On physical examination, a firm, subcutaneous, oval mass on the left prodorsal region was discovered. The bird was bright, alert with a bright pink choanal slit and appeared to be clinically normal apart from the mass; however, the bird was euthanized at the owner's request.

At necropsy, a ventral mass measuring approximately 3.5 cm and weighing 44 g was located adjacent to the pelvic bone (Figure 1). On its surface were multiple haemorrhagic ulcerations. Other findings were an intra-articular lesion at the hook joint, likely either a metastatic disease or an infectious complication of a previous fracture, renal enlargement, splenomegaly and bleeding spots on the liver. Differential diagnoses for the mass included abscess, cyst, granuloma, xanthoma, chronic haematoma or neoplasia.

The case showed many significant findings in the complete blood count (CBC) and plasma biochemical analysis. Leukocyte counts were normal (5.4 k/μL) but abnormality of neutrophils and band neutrophils were respectively increased at 74% and 9%, both suggest inflammation that probably related to the tumour. There was a significant drop in lymphocyte count (15%) which may be due to stress-induced or immune suppression as generally observed in chronic diseases of cancer people. Finally, the finding of toxic changes in neutrophils also supports a diagnosis of severe inflammation (Table 1). Biochemically, this analysis showed the presence of hypoalbuminemia (1.01 g/dL) and hypoproteinemia (2.92 g/dL). These findings may reflect poor nutrition or chronic disease-related losses of protein, including possible hepatic dysfunction, which is common in cancer. Increased glucose (359 mg/dL) may be from stress response or metabolic malformation due to underlying risky metabolism possibly attributed to the tumour. Cholesterol (143 mg/dL) and triglycerides (77 mg/dL) were in normal ranges, suggesting that lipid metabolism was not considerably disturbed. Nonetheless, the calcium levels were marginally lower (7.8 mg/dL), consistent with hypocalcaemia which may be due to the cancer or malnutrition (Table 2) (Harrison et al. 2006; Agina et al. 2017).

Hypoalbuminaemia, increased inflammatory markers and mild modification of the liver enzymes (ALT: 84 U/L) reflecting a systemic effect of liposarcoma. This analysis highlights the quail's physiological response to the tumour and might help serve as an important comparison for avian oncology, especially with small species like quail.

TABLE 1 | The blood profile of the common quail (*Coturnix coturnix*).

Parameters	Value	Normal range	Unit
Neutrophils	74	25–50	%
Band Neutrophils	9	0–5	%
Lymphocytes	15	50–70	%
Monocytes	2	0.5–4	%
Toxic change	++		
HCT	38	35–55	%
PLT	500	20–50	10^3/μL
WBC	25	12–25	10^3/μL

TABLE 2 | The serum biochemistry profile of the common quail (*Coturnix coturnix*).

Parameters	Value	Normal range	Unit
Total protein	2.92	3–5	g/dL
Albumin	1.01	1.3–2.5	g/dL
Glucose	359	200–300	mg/dL
Triglycerides	77	50–150	mg/dL
Cholesterol	143	100–200	mg/dL
Urea	4	5–7	mg/dL
Bilirubin total	0.02	0–0.3	mg/dL
AST (AGOT)	162	300–400	U/L
ALT (SGPT)	84	5–15	U/L
ALP	652	300–700	U/L
GGT	4	1–5	IU/L
Lipase	178	0–200	U/L
Amylase	208	100–500	U/L
Ca	7.8	7–12	mg/dL
P	2.65	2–6	mg/dL

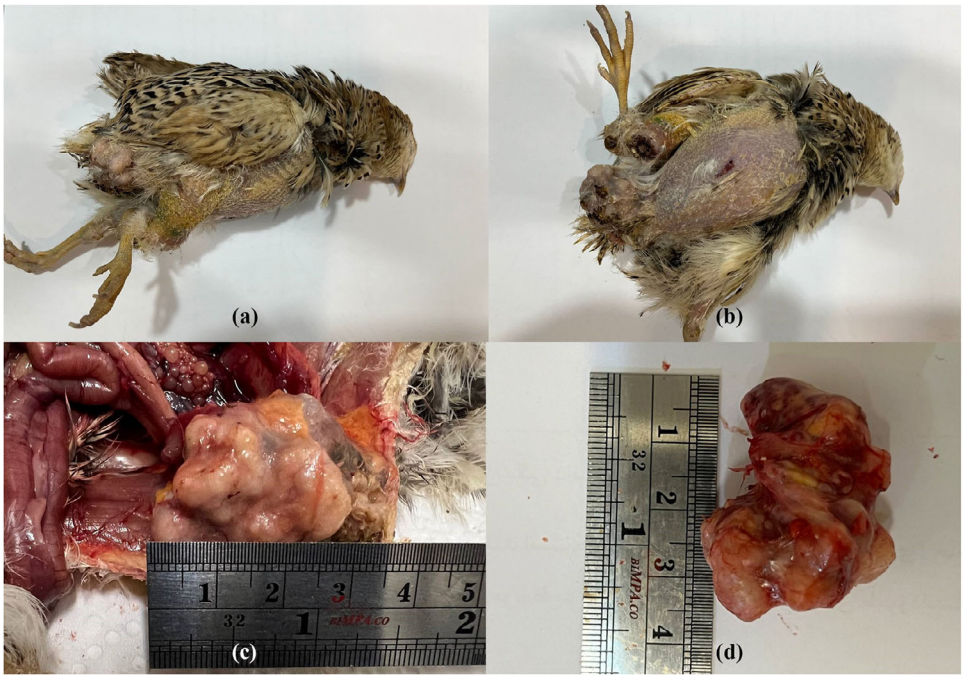

FIGURE 1 | a) The dorsal mass next to the pelvic bone was noticed b) The large subcutaneous mass was firm and oval-shaped. c) Necropsy was performed and the mass was connected to pelvic bone. d) The Removed mass was measured 3.5 cm with multiple red lesions on its surface.

In histopathological investigation, the mass was composed of round to polygonal cells arranged in sheets, separated by thin fibrovascular stroma. The majority of cells were similar to normal adipocytes, with a single intracytoplasmic vacuole that displaced the large nucleus to the periphery. Other cells were characterized by variability in size, round to oval nuclei and abundant cytoplasm that contained variably sized lipid droplets. Some neoplastic cells had cellular and nuclear pleomorphism (Figure 2). Immunohistochemically, the sections were uniformly positive for Vimentin and S-100 (Figure 3). Well-differentiated liposarcoma was diagnosed based on histopathological findings.

3 | Discussion

The differential diagnoses of subcutaneous masses in birds, depending upon the morphology are incredibly broad-ranging (e.g., abscesses, panniculitis and neoplasia). Subcutaneous abscesses are a common finding in avians and often seen around the head, paranasal sinuses, eyes or lower beak therefore remain a top differential during work up (Koski 2002).

The bird adipose tissue tumours, in this sense, are of different types such as lipomas, liposarcomas, myelolipomas and haemangiolipomas. Obesity (due to excessive dietary calories and inactivity), heredity and age of the bird are all important risk factors in their formation. As the malignant counterpart of adipocytic tumours, liposarcomas are rare but clinically more significant (Zehnder et al. 2016). Liposarcomas differ morphologically, and they are classified into three categories including the well-differentiated (the most common) variant as well as pleomorphic (anaplastic) or myxoid variants. In this case, differential diagnoses for the mass in the quail included neoplastic conditions lesions as well as non-neoplastic cysts, chronic haematomas, hamartomas, abscesses or granulomatous/inflammatory reactions to retained keratin debris. Cytological analysis excluded any inflammatory and granulomatous lesions while a thorough history indicated the absence of trauma or injection supporting haematomas or injection-site granulomas as the cause. Further histological analysis identified differences that excluded lipoma (uniform adipose cells), haemangiolipoma (numerous capillaries) and myelolipoma (extramedullary haematopoiesis), confirming the diagnosis (Hendrick 2016; Schmidt et al. 2024; Kheirandish et al. 2024).

The mass that was actually visualized in this case was quite large and located towards the pelvis. Histopathological findings revealed sheets of neoplastic cells with round-to-polygonal shapes, separated by thin fibrovascular stroma. The cells contained lipid droplets of varying sizes, with lipoblasts displaying characteristic intracytoplasmic vacuoles. Vimentin and S-100 were also strongly positive in tumour cells, confirming the diagnosis of well-differentiated liposarcoma on immunohistochemical staining.

Unfortunately, treatment options for avian liposarcomas remain limited due to the lack of established chemotherapy or radiotherapy protocols for birds. At present, surgical excision remains the most effective method (Turrel et al. 1987; Filippich 2004). In this case, despite previous surgical intervention with a wide excision margin, the tumour recurred within three months, likely due to residual neoplastic cells. This recurrence ultimately resulted in the owner opting for euthanasia

The treatment of lipoma and liposarcoma are drastically different so the clinical similarities between these neoplasms reinforce the importance of an accurate diagnosis. Although FNA may give some initial information, only complete surgical excision and

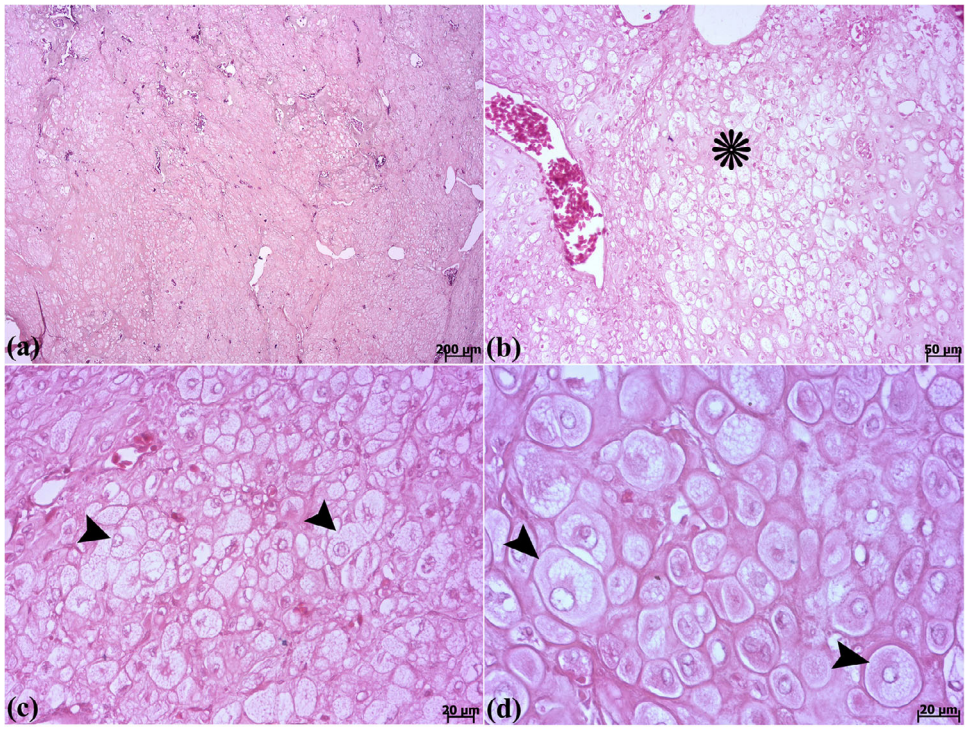

FIGURE 2 | (a–d) Histopathological findings of well-differentiated liposarcoma. (a) Sheets of neoplastic cells separated by thin stroma. (b) Round to polygonal neoplastic cells (*). (c,d) Large and pleomorphic cells with variably sized lipid droplets (arrowheads). H&E.

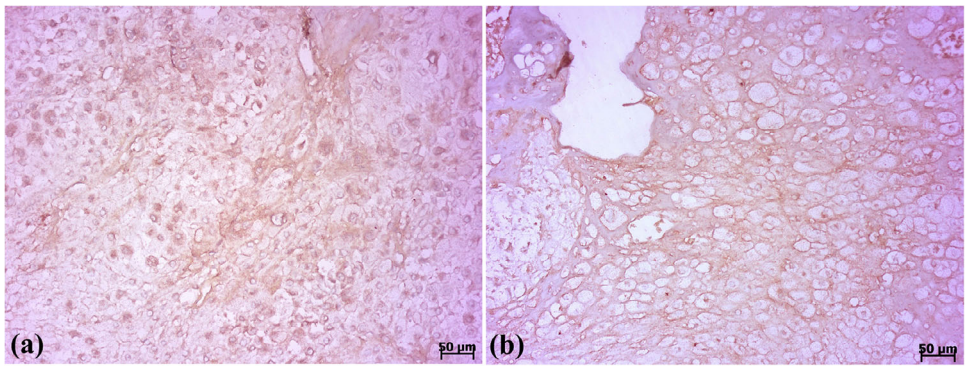

FIGURE 3 | Neoplastic cells had diffuse cytoplasmic positive staining for S100 (a) and Vimentin (b) immunohistochemistry.

histopathologic examination can provide reliable distinction for an accurate diagnosis and treatment plan.

Author Contributions

Mohammad Barari: investigation (equally), resources (equally), writing – original draft preparation (lead), writing – review and editing (supporting). **Mohammad Fallah**: investigation (equally), resources (equally). **Sara Shokrpoor**: resources (Lead), writing – review and editing (supporting). **Jamshid Razmyar**: conceptualization, methodology, project administration, writing – review and editing (lead), validation.

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Ethics Statement

All procedures performed in this research were conducted ethically and responsibly, fully adhering to applicable codes of experimentation and relevant legislation. The euthanasia of the bird was carried out at the owner's request, ensuring humane treatment and compliance with ethical guidelines for animal welfare.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Peer Review

The peer review history for this article is available at https://www.webofscience.com/api/gateway/wos/peer-review/10.1002/vms3.70551.

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