CASE REPORT

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Surgical management of infiltrative lipoma on the ventral abdominal region of a one-year-old Alsatian cross bitch

C Unamba-Oparah[1]*, CO Ukwueze[1], SA Babalola[2], NU Njoku[1], RO Ukaha[1], IC Unamba-Oparah[3] & TO Nnaji[4]

1. *Department of Veterinary Surgery and Radiology, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria*
2. *Department of Veterinary Medicine, Surgery and Radiology, University of Jos, Plateau State, Nigeria*
3. *Department of Veterinary Pathology, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria*
4. *Department of Veterinary Surgery and Radiology, University of Nigeria, Nsukka, Nigeria*

*Correspondence: Tel.: +2348030942147; E-mail: unambaoparahc@gmail.com

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Abstract

Lipomas with intramuscular infiltration are prone to recur when they are not resected with a wide margin irrespective of their location whether in the trunk, extremities or the head and neck. These benign tumours can rapidly enlarge; infiltrate local tissues, thus requiring wide-margin resection which is performed with an attempt to preserve important structures as much as possible. A 1-year-old Alsatian cross bitch was presented at the Veterinary Teaching Hospital of the Michael Okpara University of Agriculture, Umudike with a complaint of growth on the ventral abdomen. On physical examination, the physiological parameters including rectal temperature, respiratory and heart rates were within the normal range of values for dogs. A pendulous round mass measuring about 12 cm X 6 cm X 4 cm at the ventral abdominal region which on palpation was firm and painless was also observed. Fine needle aspirate cytology revealed lipocytes occurring singly and in groups. The growth was surgically excised under injectable general anaesthesia. Histopathology showed severe proliferation of adipocytes and adipose tissue in the dermis and muscle layers of the abdominal wall. The case was followed up for up to 12 months and there was no recurrence. This case report provides evidence that surgical excision of infiltrative lipomas if carefully done to remove all tumour tissues, can be curative.

Keywords: Adipocytes, Alsatian cross, Bitch, Infiltrative lipoma, Surgical management

Introduction

Lipomas, benign neoplasias of adipocytes (lipocytes), are commonly reported in dogs and can be disturbing to owners. Lipomas are neoplasias of mesenchymal tissue origin and are often clinically unremarkable but can grow so large, become heavy or outgrow their blood supply, thereby causing problems like pain, necrosis and difficulty in mobility depending on their location (Spoldi *et al*., 2017). Cases of intra-cavity lipomas and lipomas adjacent to neural structures, causing clinical signs due to compression traumas to tissues or organs have been widely reported (Spoldi

et al., 2017). Lipomas of the dermis and subcutaneous tissues are common in older dogs.

The factors that have been reported to increase the risks for lipomas include; advancing age, overweight and sex; occurring more frequently in females (Hendrick, 2017). McEntee & Thrall (2001) however reported a 1:1 incident ratio between the males and the females. There seems to be breed predisposition with higher incidence in Dobermann Pinschers and Labrador Retrievers, Weimaraners, Springer Spaniels, Beagles, German Pointers, Miniature Schnauzers and Cocker Spaniels (O'Neill *et al*., 2018).

The incidence rate of lipomas is 5.1% of all diagnosed canine neoplasms (Goldschmidt & Hendrick, 2002), occurring in approximately 16% of dogs (Lamagna *et al*., 2012). The occurrences are far less in other species (Goldschmidt & Hendrick, 2002). The majority of lipomas are asymptomatic and do not require surgical intervention, but aggressive treatment may be essential for the local control of infiltrative lipomas and liposarcomas (Spoldi *et al*., 2017).

Lipomas are classified as infiltrative when they invade adjacent structures, most commonly muscle and fasciae (Bruckner *et al*., 2009). Infiltrative lipoma is a relatively uncommon tumour, is considered benign and does not metastasize to distant organ, but can invade immediate adjacent tissues such as muscle, joint capsule or even bone depending on the location (Bergman *et al*., 1994). Infiltrative lipomas are distinct from liposarcomas in that they show infiltrations by neoplastic lipocytes, frequently recur after surgical excision and are characterized clinically by soft, diffuse enlargement within muscle bodies or connective tissue (McChesney *et al*., 1980). Infiltrative lipomas represent a separate entity from other forms of benign lipomas: although they retain the normal morphology of adipocytes, behave more locally aggressive, and show a higher recurrence rate of 36–50% compared with 2% of benign lipomas (McEntee & Thrall, 2001). The recurrence time following surgical resection in a study was approximately 6 months (Thomson *et al*., 1999).

Quite a number of imaging modalities have been used to describe and diagnose infiltrative lipomas and these include radiography, ultrasonography, computed tomography (CT) scan and magnetic resonance imaging (MRI) (Spoldi *et al*., 2017) - of these, CT and MRI are currently considered the best diagnostic tools to accurately assess the nature of the tumour, although a histologic examination of the excised mass also provides information on the nature of the tumour (Spoldi *et al*., 2017).

Surgical excision is the therapy of choice for infiltrative lipomas, although other treatments have been reported, including intra-lesional 10% calcium chloride injection, minimally invasive liposuction, irradiation and intra-lesional steroid injection (Lamagna *et al*., 2012). Intra-lesional 10% calcium chloride injection can cause skin irritation and necrosis hence, it is no longer recommended and the tendency to interdigitate muscle fibres makes liposuction unsuitable to treat infiltrative lipomas. Also, there is a need for large population-based studies to validate irradiation and intra-lesional steroid injection techniques (Lamagna *et al*., 2012). This report describes a case of infiltrative lipoma, treated by complete surgical excision.

Case Presentation

Case history

A 1-year-old Alsatian cross bitch weighing 20 kg was presented at the Veterinary Teaching Hospital of the Michael Okpara University of Agriculture, Umudike with a complaint of a soft swelling on the ventral abdomen. From the history, it was gathered that the swelling was initially small in size but increased gradually over a period of about a month. The bitch was intact, had a good appetite and was alert and active.

Physical examination and laboratory findings

Physical observation showed that the bitch was alert and active. The bitch was in good body condition and no ectoparasites were seen. There was a soft, round, tri-lobulated pendulous mass of tissue measuring about 12 cm X 6 cm X 4 cm at the ventral abdomen, lateral to the 3rd and 4th right mammary gland which was painless on palpation. Clinical examination findings indicate normal (pink) mucous membrane, less than two seconds (< 2 sec) capillary refill time, heart rate (110 bpm), increased respiratory rate (panting) and body temperature of 39.4°C. The laboratory result of the PCV and total plasma protein was 37% and 8.2 g/dL respectively. On exploratory aspiration, no pus or blood was obtained. With the suspicion of a tumour mass, fine needle aspiration cytology of the growth was performed which revealed lipocytes occurring singly and in groups within an oily field.

Surgical management

Pre-operative preparation and anaesthesia: The surgical area was clipped and prepared aseptically for surgery. The patient was premedicated with Atropine sulphate (Jiangou Huayang Pharmaceutical Co. Ltd., China) at 0.04 mg/kg IM and Xylazine HCL (VMD,

Arendonk-Belgium) at 1.5 mg/kg IM, 5min later. Anaesthesia was induced with Ketamine (Swiss Parenteral Ltd, India) at the dose of 7 mg/kg intravenously. The patient was placed in the right lateral recumbency and draped properly.

Surgical technique: The base of the mass was clamped using two pairs of Carmalt forceps (Plate I) and a semi-circular skin incision with a wide margin was made about 2 cm from the perimeter of the base of the mass and the skin was carefully reflected. The wide margin was necessary to ensure that any possible infiltrations of the lipocytes on the surrounding tissues will be seen and excised. The incision was carefully deepened through the subcutaneous tissue and cutaneous trunci muscle, ensuring that no major blood vessel was incised in the process. caudal superficial epigastric artery was seen supplying the mass (Plate II). This blood vessel was explored for any branching within the stalk. Afterwards, the major blood vessel was double ligated with size 2-0 chromic catgut (Anhui Kangning Industrial Group Co. Ltd, China) before the points of branching. The semi-circular incision was then completed to a full circle as the tissue mass was completely excised. The excised mass (Plate III) was fixed in 10% phosphate-buffered formal saline (Sigma-Aldrich Laborchemikallen GMBH, Germany) and sent to the histopathology laboratory for further examination.

The surgical wound was flushed with normal saline and the subcutaneous tissue was approximated with absorbable suture material (size 2-0 chromic catgut) in a simple continuous suture pattern. The skin incision was closed in a simple interrupted suture pattern using size 1 silk (Huaian Angel Medical Instrument Co. Ltd, China) suture material (Plate IV).

Plate I: The base of the tumour mass was clamped before a skin incision was made

Plate II: A major blood vessel (white arrow) was seen supplying the tumour

Plate III: The excised tumour mass

Plate IV: Apposed wound edges in a simple interrupted suture pattern after excision of the tumour mass

Post-operative care: The surgical wound was cleaned with gauze sponges soaked in antiseptic [Chlorhexidine solution (Saro Lifecare Ltd., Nigeria)] and a light bandage was placed and removed the following day.

The following drugs were administered: Procaine penicillin and Dihydrostreptomycin sulphate (Penstrep® Shangqiu Senaoda Animal Pharmaceutical Co, China) 10000 IU/kg and 10 mg/kg IM respectively for 5 days and Diclofenac Sodium (Jiangou Huayang Pharmaceutical Co. Ltd., China) 2.5 mg/kg IM for 3 days. The patient was discharged after full recovery from anaesthesia and the owner was instructed to re-present the patient every day for the next 4 days and subsequently, every 4 days, for wound dressing and general check-up. The sutures were removed on day 14 post-surgery.

Histopathological findings: Histopathological examination of the excised tissue confirmed the diagnosis of infiltrative lipoma with sections showing severe proliferation of adipocytes and adipose tissue in the dermis and muscle layers of the abdominal wall (Plates V and VI). In the abdominal layer, the adipocytes were seen scattered within and around the bundles of muscle fibres; infiltrating the muscles fibres and disorganising the normal architectural arrangement of the muscle tissue (Plate VA). Some parts of the muscle tissues appeared congested with areas of oedema between the bundles of muscle fibres (Plate VB). Some of the adipocytes were in bundles walled off by thin layers of fibrous connective tissues (Plate VIA). Small blood vessels were seen within the bundles of adipocytes and on the fibrous tissue wall (Plate VIA). On the skin layer, the fibrous tissue capsules around the adipocytes were thicker in some areas and blended with the structurally disrupted and hyperkeratinised dermal tissue (Plate VIB).

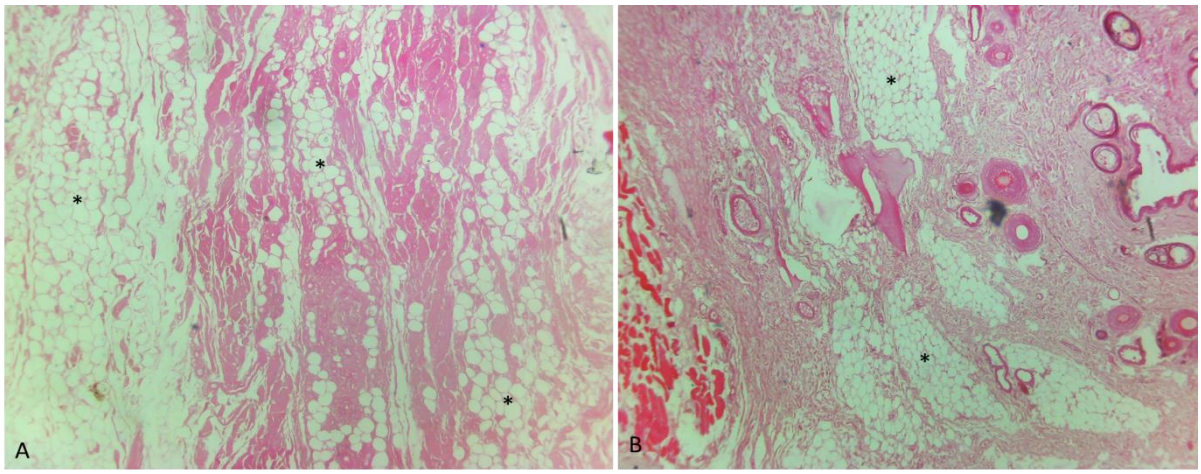

Plate V: Adipocytes (*) could be seen around and infiltrating the muscle fibres (A) and the dermis of the skin (B) of the ventral abdominal wall. H&E X 40

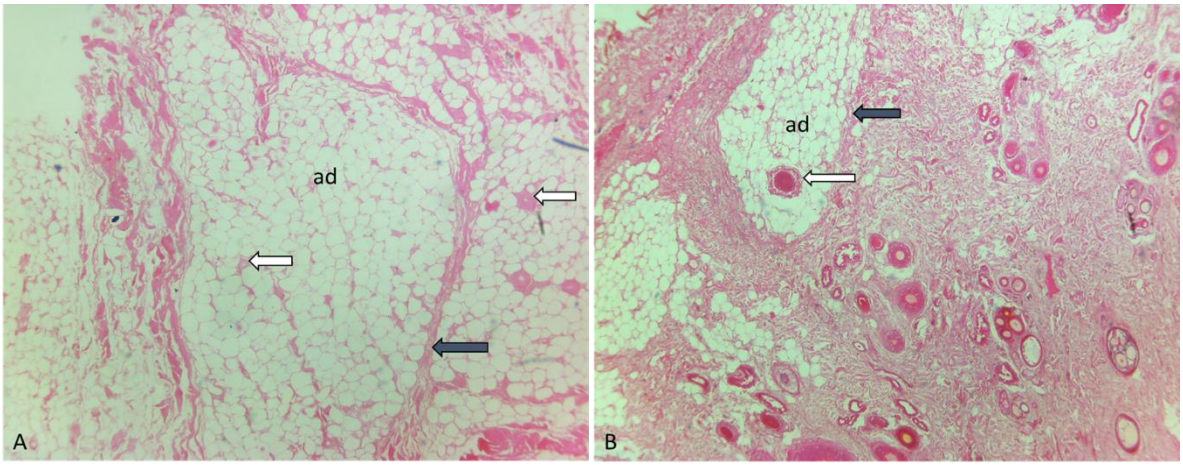

Plate VI: Some of the adipocytes (ad) occurred in bundles that were walled-off by fibrous connective tissue (black arrow) both in the muscular layer (A) and the dermal layer of the skin (B). Some supporting blood vessels (white arrows) can be seen growing amidst the adipocytes. H&E X 40

Discussion

Infiltrative lipoma is differentiated from simple lipoma by its infiltrative nature and high recurrence rate and from liposarcoma by the benign appearance of its neoplastic fat cells–(McChesney *et al.,* 1980). Some Infiltrative lipomas have been documented to have occurred after the surgical removal of a lipoma and this suggests that infiltrative lipomas may be caused by trauma. However, other Infiltrative lipomas often occur with no history of previous lipomas (McChesney *et al.,* 1980). In this case, there was no history of trauma or previous surgical removal of a lipoma. The infiltrative lipoma seen in this case was pendulous probably due to its location with the attendant gravity pull. This may explain the lack of pain commonly associated with infiltrative lipoma as it was not compressing any adjacent tissues or nerves. This was probably also why the supplying blood vessel was easier to access for ligation. There was no gross evidence of metastasis in this case which is normal with infiltrative lipomas (McEntee & Thrall, 2001). Simple (regular) lipoma, infiltrative lipoma, and liposarcomas may appear the same when fine needle aspirate is carried out (Bergman *et al*., 1994) but are distinguished by tissue biopsy if infiltration of adjacent tissues were captured in the sample (McEntee & Thrall, 2001) and histopathology. The histopathological examination findings confirmed the infiltrative nature of the lipoma with adipocytes seen invading muscle fibres, disrupting their normal structure.

The preferred intervention for infiltrative lipomas is surgical excision of the mass, but other treatments, including calcium chloride injection, irradiation etc have been used, though each of these options has its limitations (Lamagna *et al*., 2012). This case was treated with a wide-margin surgical excision which ensured that all the tumour tissues were removed with the patient healing uneventfully. Surgical management of infiltrative lipoma may result in post-operative complications depending on the location and depth of the lipoma and include anaesthetic risks, delayed surgical wound healing, seroma build-up, and nerve damage (Lamagna *et al*., 2012). None of these postoperative complications or any other was reported in this case.

A major challenge associated with infiltrative lipoma is the high probability of recurrence. Bergman *et al*. (1994) reported a recurrence rate of 36% with 239 days median time of recurrence. However, in this case, at re-examination 6 weeks post-surgery (Plate VII), there was no evidence of recurrence. This may be due to the pendulous nature of the tumour and the wide margin resection which made it possible for all the tumour tissues to be completely excised. The dog was followed up for 12 months post-surgery via phone calls and there was no report of recurrence.

Plate VII: Wound site six weeks post-surgery

In conclusion, this report describes the case of an infiltrative lipoma located in the ventral abdominal region. The mass was surgically excised and there was no recurrence after 1-year follow-up post-surgery, evidence that a wide-margin surgical excision of infiltrative lipoma can be curative.

Conflict of Interest

The authors declare that there is no conflict of interest.

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