CASE REPORT

Nevus lipomatosus cutaneus superficialis (Hoffmann–Zurhelle) in a Chimpanzee (Pan troglodytes)

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Introduction

Nevus lipomatosus cutaneus superficialis (NLCS) is a rare idiopathic hamartomatous disorder in humans, that was first described by Hoffmann and Zurhelle in 1921 [10]. So far no familial incidence or sex predilection has been shown [1, 10]. The NLCS has been classified clinically into two variants, a multiple (classic), and a solitary type [4, 12]. The classic form is usually congenital or develops during the first three decades of life. The affected area is commonly static in size but can continue to extend over years and possesses a plaque-like surface that is either smooth, verrucous or cerebriform [4, 6]. The lesion more commonly appears at the pelvic girdle, lumbar areas and buttocks and only rarely crosses the midline [1]. The solitary type displays a singular nodule with no favored location. It usually occurs during the fourth to sixth decade of life [18]. Both types are characterized histopathologically by aggregates of mature adipocytes within the mid and upper dermis that separate preexisting dermal collagen fibers with rare connection to the subcutis [5, 13].

This report describes a chimpanzee which was kept in a zoological garden and diagnosed with a dermal lesion at the pelvic girdle that has features attributed to a NLCS described in humans.

Case report

Animal

Chimpanzee Pan troglodytes, 32-year-old male.

Clinical history

In 1998 the 85 kg, 32-year-old male chimpanzee presented a large dermal, plaque-like, nodular mass at the left inner thigh extending into the inguinal region.

Keywords


Abstract

Background A 32-year-old, male chimpanzee (Pan troglodytes) kept in a zoo developed a focally extensive, proliferative, cerebriform, dermal mass at the left inner thigh extending to the inguinal region. After surgical removal, the mass recurred and extended progressively over a period of 5 years.

Methods and Results At necropsy, a 20 × 20 cm large, well defined, papular and partly verrucous, rubbery mass composed of multiple large, soft nodules measuring up to 4 cm in diameter was observed in the left thigh and inguinal region. Histological examination revealed a multifocal expansion of the dermis by mature adipocytes that were arranged in small islands to large lobular aggregates. Dermal proliferations of adipocytes were almost completely separated from the subcutaneous adipose tissue.

Conclusions This is the first report of a unique lesion that resembles human Nevus lipomatosus cutaneus superficialis in a chimpanzee and is different from lipoma or liposarcoma.
Because of its constant increase in size (750 g) and the mechanical interference with movement the lesion was surgically removed in 2001. The mass was diagnosed histopathologically as a fibrolipoma without any features of malignancy.

The lesion recurred at the same location in 2004 and increased in size to almost the same dimension as the primary tumor. In May 2005 the animal died as a result of unrelated enterotoxic shock with disseminated intravascular coagulopathy and subsequent congestive heart failure.

Gross findings
At necropsy the animal showed at the left inner thigh and the inguinal region a 20 × 20 cm large, well defined, cerebriform, plaque-like mass composed of multiple large, soft nodules up to 4 cm in diameter (Figs 1 and 2). On cross section, the nodules were composed of multiple, yellow lobules and islands of adipose tissue that mainly surrounded hair follicles and were separated by broad strands of fibrous tissue.

Histopathological findings
Tissue samples were fixed in 4% phosphate-buffered neutral formaldehyde and processed for paraffin-embedding. Paraffin-wax sections (2 μm) were dewaxed and stained with hematoxylin and eosin.

Histological examination revealed an elevation of the mildly acanthotic and hyperkeratotic epidermis. The dermis was expanded by a non-encapsulated, poorly circumscribed mass, that was composed of mature adipocytes, arranged in small islands to large lobular aggregates and separated by broad strands of pre-existing collagen bundles of the reticular dermis (Fig. 3). Dermal adipocytes were large polygonal to round cells which contained a large cytoplasmic vacuole that peripheralized the small uniform nucleus (Fig. 4).

Fig. 1 Left hind leg, chimpanzee. Large, well defined verrucous cauliflower-like mass at the inner thigh and the inguinal region.
Fig. 2 Left hind leg, chimpanzee. Multinodular and cerebriform surface of the plaque-like mass.
Fig. 3 Skin, left hind leg, chimpanzee. Expansion of the dermis by islands and large lobular aggregates of mature adipocytes surrounded by broad strands of collagen. H&E stain, Bar = 1 mm.
Mitotic figures were absent. Dermal proliferations of adipocytes were separated from the subcutaneous adipose tissue by collagenous tissue and epidermal adnexae. However, connections between the dermal and the subcutaneous adipose tissue were only very rarely observed and confined to small bridges of few clustered adipocytes. Multifocally small numbers of perivascular lymphocytes and histiocytes could be observed in the dermis.

Discussion

In this report a lesion that resembles human NLCS is described in a chimpanzee. The lesion was located at the inner thigh and the pelvic girdle, recurrent and progressive and composed of islands of mature adipocytes independent from the subcutaneous adipose tissue. To date, several theories regarding the pathogenesis of NLCS have been proposed. At the moment, it is assumed that it develops from dermal primitive, perivascular lipoblasts that subsequently proliferate and progress to mature adipocytes [2, 9, 14, 16, 17]. Originally it was stated, that the deposition of the adipose tissue is secondary to degenerative changes in dermal collagen or elastic tissue or that the lesion results from focal heterotopic development of adipocytes [7, 10, 15]. Nevertheless, the true histogenetic origin of the NLCS remains unclear. Additionally, the marked predilection of this lesion for the pelvic girdle could not be elucidated. It is hypothesized that the pelvic girdle as a lipo-philic zone has a predisposition to lipodystrophies also based on the special blood circulation in this location [9, 11]. In contrast to neoplasms nevi are composed of excessive mature tissues and their growth is temporarily limited. The recurrence and progressive growth of the described nevi after surgery is unusual but comparable with the situation in men, where NLCS are described as usually static but occasionally recur und continue to extend for many years [6].

Differential diagnoses included lipoma, localized scleroderma and dermal nevus. However, histopathological examination clearly separates these three entities. Lipomas appear as well circumscribed subcutaneous neoplasms of mature adipocytes that lack the typical cerebriform macroscopic appearance [8]. Localized scleroderma can be separated from NLCS by the markedly thickened collagen bundles that replace eccrine glands with their surrounding adipose tissue and the associated moderate lymphocytic infiltrate. At the macroscopic level, the giant congenital intradermal nevus, known as cerebriform nevus, bears a resemblance to NLCS, but histologically it is composed of proliferating melanocytes along the dermoeipidermal junction or the dermis [3].

This is the first report of a dermal lesion resembling human NLCS in a chimpanzee. We therefore propose that this entity should be included in this species as a differential diagnosis for nodular lipomatous dermatoses, especially at the pelvic girdle.

References


