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The emerging topic of injected cosmetic fillers in the perinasal region of dromedary camels: ultrasonographic and radiographic verification

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Abstract

Background: Dermal cosmetic fillers have been commonly used in camels in the last few years in Gulf countries.

Aim: This study aimed to describe the radiographic as well as sonographic findings of injected cosmetic fillers in Arabian camel perinasal region in beauty shows.

Methods: A total number of ($n = 11,626$) Arabian camels (*Camelus dromedarius*) were thoroughly investigated for injection of cosmetic fillers in the perinasal area. The age of the camels was 6 months to 10 years, and their weights were 400–650 kg. In parallel, a control group consisting of 30 age/weight-matched non-injected camels was used. Of the 11,626 examined camels, 25 animals (0.0002%) were injected with cosmetic fillers in the perinasal region. Of the 25 camels, 19 (76%) were females and 6 (24%) were males. Radiographic examinations were carried out for the 25 injected camel perinasal regions.

Results: Ultrasonographic examination of the injected perinasal regions revealed precise discrimination of the filler material, which appeared hypo-echogenic in 17 camels (68%) and with anechoic spots in the remaining 8 camels (32%). Variable degrees of swelling caused by the injection of moderate and large quantities of fillers were noted by radiographic assessment, the injected cosmetic filler was precisely diagnosed in the perinasal region as grey in color having soft tissue density in obtained radiographs.

Conclusion: In conclusion, radiographic and ultrasonographic examinations are reliable, accurate, and non-invasive diagnostic imaging techniques that can precisely discriminate a filler agent in the soft tissues and determine the situ and size of cutaneous deposits in dromedary camels (*C. dromedarius*).

Keywords: Cosmetic fillers, Diagnostic imaging, Pathology, Perinasal area, Camel.

Introduction

In recent years, cosmetic fillers have been widely utilized by plastic surgeons as exogenous substances in human medicine as well as in veterinary medicine, to diminish the natural adverse of senility, including, loss of skin tone, or for lip and cheek augmentation as well as development of wrinkles. Two categories of fillers are reported in human and veterinary practice including, biological, such as hyaluronic acid (HA), and synthetic substances, such as silicone, polymethylmethacrylate, calcium hydroxyapatite, polyacrylamide, and biopolymers (Ashinoff, 2000; Díaz, 2019; Klein, 2001; Tharwat and Al-Hawas, 2021).

Recently, there more than 100 filler products have flooded in the market, dermal filler is one of the most famous nonsurgical cosmetic interventions

currently being used by several practitioners other than dermatologists and plastic surgeons (Vedamurthy, 2018). Dermal filler causes several complications including, edema, erythema, bruising, palpable lumps, and discoloration (Haneke, 2015; Lin and Christen, 2020), as well as vascular complications causing tissue necrosis and loss of vision (Wollina and Goldman, 2020).

In human medicine, it is well known that the use of skin fillers, even those agreed by the United States Food and Drug Administration, can initiate early or late, reversible or irreversible complications. These complications may include ecchymosis, cellulite, edema, hypersensitivity reactions, granulomas, palpable or visible masses, abscesses, dermatopathy, necrosis fistulas, and even blindness (Choi *et al.*, 2023; Kassir *et al.*, 2020; Schütz

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et al., 2012). Although the related risk of vascular necrosis due to filler injection is low, the outcomes can be severe when they occur. Therefore, Mannino *et al.* (2023) concluded that clinical studies on the treatment and management of filler injection combinations are necessary in humans to provide scientific evidence on what to do in case of vascular complication occurrence. In dromedary camel medicine, some complications were also encountered following cosmetic procedures. Of these drawbacks is abscess formation that can be detected within the labial at the injection site tissue in camels. Other complications of the filler injection included palpable masses or nodules, granulomas, and necrosis of the overlying skin tissue (Tharwat, 2024). Radiography and ultrasonography (US) are reliable non-invasive diagnostic imaging techniques, it is widely used to provide accurate details regarding the extent and character of the injected fillers in the head region of camels. Over the last few years, ultrasound and radiography for the detection of the health and pathological conditions in dromedary camels have been recorded by our research team (Al-Sobayil *et al.*, 2020; Sadan, 2019; Sadan *et al.*, 2023; Tharwat, 2020a,b; Tharwat *et al.*, 2018).

US was proven to be highly effective in examining camels either in healthy (El-Tookhy and Tharwat, 2012; Tharwat, 2013) or diseased (Sadan M, 2024; Tharwat, 2019, 2020a,c,d, 2021, 2024; Tharwat and El-Tookhy, 2021) states. In 2021, our research group documented the first report in veterinary medicine summarizing ultrasound detection of cosmic filler injection of lips in camel beauty pageants (Tharwat and Al-Hawas, 2021). In addition, our research group has also reported the effectiveness of thermography in camel beauty festivals through the detection of injected as well as extended lips (Tharwat and Al-Hawas, 2023; Tharwat *et al.*, 2021a; Tharwat and El-Tookhy, 2021). In continuation to our previous work, this study was designed to describe the effectiveness of radiography and US in verification of injected fillers in the perinasal region in camel beauty pageants.

Material and Methods

Camels

Experimental design has been reported recently (Tharwat and Al-Hawas, 2021). The experiment was carried out during the events of the 4th King Abdulaziz Camel Festival during the period of December 13th, 2019 to January 16th, 2020. A total number of 11,526 dromedary camels (*Camelus dromedarius*) were thoroughly investigated for injection of cosmetic fillers in the perinasal area. The average age of the camels was 6 months–10 years, and their weights were 200–650 kg. In parallel, the control group consisted of 30 age/weight-matched non-injected camels were used in this study. All included camels were inspected in a standing position for any apparent abnormality.

Ultrasonographic examination

According to the festival committee regulations, tranquilizers were prohibited during radiographic and ultrasonographic examinations of camels because it may affect their performance during the show and subsequently affect the evaluation. Therefore, a number of well-trained assistants helped in the control of these camels during the examination of these animals. High-resolution ultrasound (Eickemeyer® Magic P1, Tuttlingen, Germany) was used for scanning the sides and dorsal parts of the maxillary and perinasal region regions. The region to be examined was sprayed with alcohol and then gel was applied. The perinasal region and facial skin were scanned using a 3.0–13.0 MHz linear transducer (Tharwat and Al-Hawas, 2021).

Radiographic examination

Radiographic examination of the maxillary and perinasal regions was carried out using a Min-X-ray HF 100/30 generator with a 70 kVp, 2.0 mAs, and a 70-cm focal film distance (Toshiba, Japan). Lateromedial and dorsoventral radiographs were used to examine the affected camels. All obtained radiographs were subjectively interpreted. Each radiograph was interpreted while blinded as to which camels received filler injections or not.

Ethical approval

The Animal Welfare and Ethics Committee of Qassim University approved the protocol of the study.

Results

Twenty-five (0.22%), out of 11,526 examined camels were injected by cosmetic fillers in the perinasal region. Of the 25 camels, 19 (76%) were females and 6 (24%) were males. None of the injected camels had a history of recent illness. Variable enlargements of the maxillary and perinasal region areas were noted when examined from a close distance. Feeling the affected parts in 16 camels (64%) detected a jelly-like material found subcutaneously between the skin and nasal bone on both sides, and showing the appearance of cockscomb after compression. In 4 camels (16%), hardening and thickening of the skin was observed with hard nodules distributed subcutaneously in a regular manner. In severely injected cases, corrugated skin was apparent in 5 camels (20%) on a close examination without hand compression of the injected parts (Fig. 1). None of the above-mentioned abnormalities was recorded in the control group.

When examining the perinasal region by ultrasound, the filler material appeared hypoechogenic in 17 camels (68%) (Fig. 2A) and with anechoic spots in the remaining 8 camels (32%) (Fig. 2B). The injected material was just dorsal to the maxillary in 14 camels (56%). The injected filler was injected anteriorly and dorsal to the nasal cartilage in 6 camels (24%). In 5 camels, injection was applied in both locations (20%). Radiographic findings of the examined camels revealed swelling of the surrounding soft tissues to the extent of



Fig. 1. Enlargement of the maxillary and perinasal region in a female camel due to injection of a cosmetic filler material. Compressing of the injected material reveals a doughy texture and protrusion (blue arrows) which continue for a long period. This jelly-like material was found subcutaneously between the skin and maxillary, and nasal bones on both sides, showing the appearance of a cockscomb after compression.

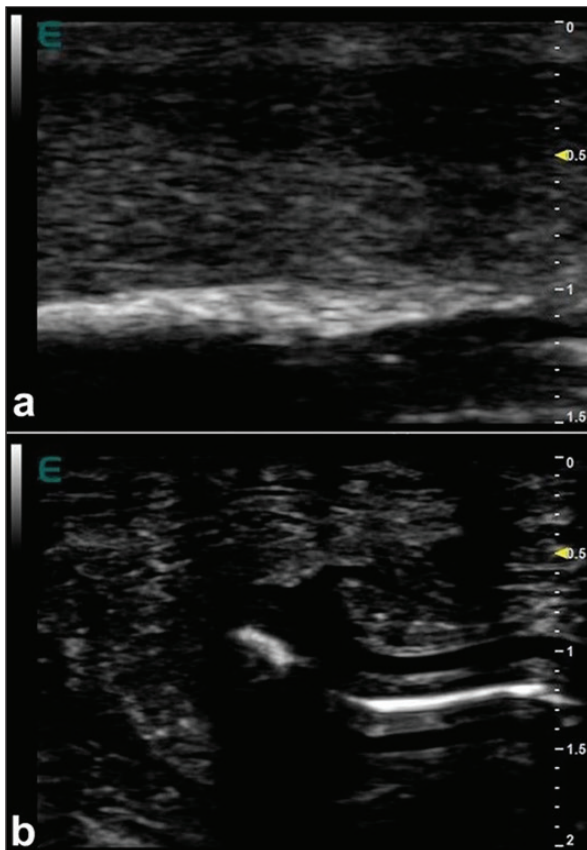


Fig. 2. Ultrasonographic features of 2 camels injected with perinasal region fillers. The filler material appeared hypoechogenic with anechoic spots. In image (a), the injected material was just dorsal to the maxillary bone. In image (b), the injected filler was injected anteriorly and dorsal to the nasal cartilage.

variable degrees caused by the injection of moderate (Fig. 3B) and large quantities (Fig. 3C) of filler anterior and posterior to the nasal bone with no evidence of any radiographic changes at the nasal cartilage and nasal bones in comparison to a healthy camel with no injections (Fig. 3A). The injected cosmetic filler was precisely diagnosed in perinasal region grey in color having soft tissue density in obtained radiographs.

Discussion

In the Gulf region, cosmetic enhancement in camels was mostly used in the last few years. Injectable exogenous materials known as “fillers” were utilized as antiaging procedures and providing rejuvenation. Because of the huge prizes awarded to the winners in this camel beauty contest, some owners resort to altering the natural appearance of their camels through different methods, especially on the lips. Different ways to detect these methods include clinical examination, sonography, thermography, and laboratory evaluation of injected testosterone and growth hormones (Tharwat and Al-Hawas, 2023; Tharwat, *et al.*, 2021a,b). To the best of our knowledge, this study is the first report that documents the detection of cosmetic filler injection in the dromedary camel perinasal region in beauty pageants and its diagnosis using ultrasonographic or radiographic findings.

Injection of fillers as cosmetic substances into the lips of camels was reported as one of the cheating methods frequently used, resulting in overall swelling, drooping, swinging, and hardness of the tip of injected lips (Tharwat and Al-Hawas, 2021). This result is in accordance with our findings; in the present study, injection of filler at the perinasal region and maxillary areas revealed the presence of jelly-like material found subcutaneously between the skin and bones, in addition to variable swellings with the presence of hard nodules distributed subcutaneously in a regular manner in both sides of the perinasal region and maxilla. This may be attributed to the inflammatory process that occurred as a result of the injection of these foreign materials (Haneke, 2015; Vedamurthy, 2018; Wollina and Goldman, 2020).

According to the results of recent research, the use of injectable filler materials can result in reversible or even irreversible adverse effects in humans. These effects may include edema, erythema, bruising, discoloration, cellulite, hypersensitivity reactions, palpable or visible masses, granulomas, abscesses, fistulas, necrosis of the tissues, vascular compromise, and even loss of vision in rare cases (Kroumpouzou *et al.*, 2023; Lin and Christen, 2020; Wollina and Goldman, 2020). In the present study, the injection of cosmetic fillers at the perinasal region area led to the hardening of the skin over the perinasal region with the presence of multiple hard nodules at the injected area.

Nodular lesions and granulomas of the lip have been recorded in female patients due to filler injection (Capodiferro *et al.*, 2019; Convery *et al.*, 2021).

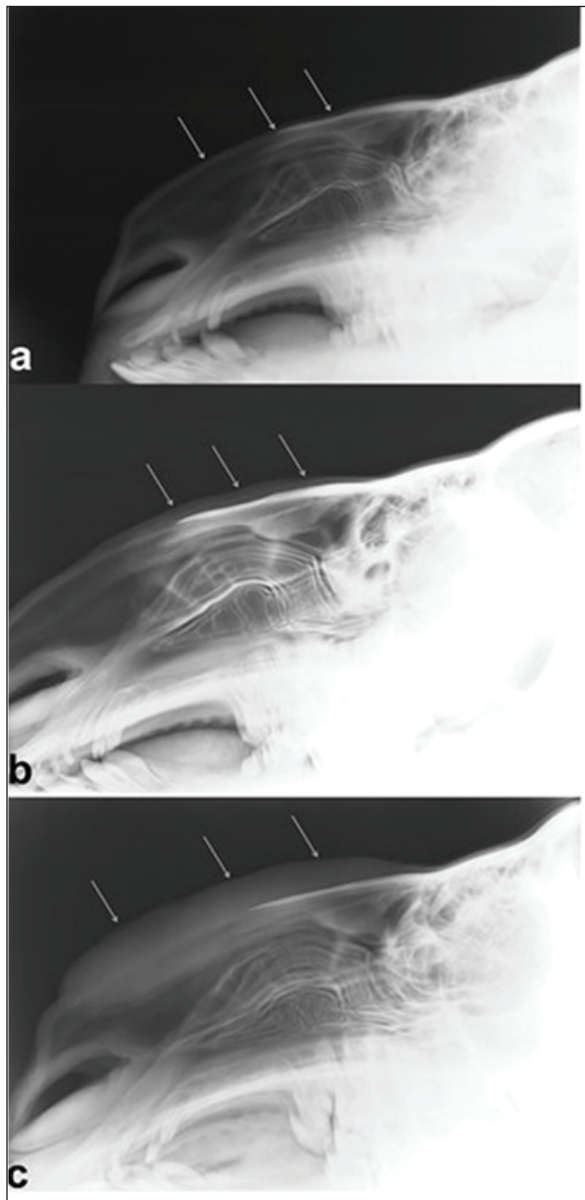


Fig. 3. Lateral radiographic view of 3 camels injected with perinasal region fillers. Image (a) shows a healthy camel with no injections. Images (b and c) show camels with moderate and large quantities of filler injection, respectively. Please note the swelling of the surrounding soft tissues anterior and posterior to the nasal cartilage.

Histopathological examination of these lesions revealed pools of amorphous hematoxyphilic material surrounded by bands of dense connective tissue, with no inflammatory reaction. Unfortunately, histopathological evaluation of the injected perinasal area was not available in our study because, all camels shared in the beauty show are highly valuable, and most of them were of high price reaching millions of dollars. As well as the owners refused the biopsy

because they thought that, the biopsy would harm their camels.

According to the results of the present study, ultrasonographic examination precisely diagnosed in perinasal region cosmetic filler material as hypo-echogenic to anechoic areas. The injected material appeared just dorsal to the maxillary and nasal bones, while radiographic evaluation showed swelling of the soft tissues to the extent of variable degrees caused by the injection of moderate and large amounts of cosmetic filler, the injected cosmetic filler was precisely diagnosed in perinasal region grey in color having soft tissue density in obtained radiographs. This finding disagrees with those reported by (Kwon *et al.*, 2018) who recorded the radiopaque density of injected unknown filler material in 3 cases, and (Valiyaparambil *et al.*, 2009) who described a case of An unusual soft tissue radiopacity-radiographic appearance of a dermal filler (calcium hydroxyapatite-based dermal filler). The difference in the tissue densities may be attributed to various types of used injected fillers, whereas the most famous injected filler material in camel is HA. Our findings clearly detect the useful role of ultrasound and radiography as a diagnostic imaging technique used for the precise diagnosis of injected cosmetic fillers and as a tool for detecting their expansion in the soft tissues. These findings were in accordance with (Kroumpouzou, *et al.*, 2023; Tharwat and Al-Hawas, 2021).

Conclusively, ultrasonographic and radiographic examinations are reliable, accurate, and non-invasive diagnostic imaging techniques that can precisely discriminate a filler agent in the soft tissues and determine the situ and size of cutaneous deposits in dromedary camels (*C. dromedarius*) injected with fillers in the perinasal region. Clinical examination of the injected perinasal region should be performed before ultrasonographic and radiographic evaluation for detection of softening or hardening of the injected tissue. In spite of HA as one of the cosmetic fillers mostly injected fillers used in camels in the last few years in the Gulf area, the injected materials in camels of our research are unknown. This is considered as a limitation of our investigation; therefore, our findings are considered preliminary. Further research is necessary to experimentally inject HA and or other cosmetic fillers and thereafter distinguish their ultrasonographic and radiographic details through long-term follow-up of the tissue changes.

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Author contributions

M.T., M.S.: concept and design the proposal. M.T., M.S., and A.A: performed the experimental section.

M.S., M.T., and A. A.: analyzed and interpreted the data. All authors revised and approved the final manuscript.

Conflicts of interest

The authors declare no conflicts of interest.

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Data availability

All data supporting the findings of this study are available within the manuscript and no additional data sources are required.

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