Deoxycholic Acid for Submental Convexity: A MAUDE Database Analysis

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ABSTRACT

Introduction/Objectives: Deoxycholic acid (DOC) injections are a novel, in-office procedural alternative to submental liposuction or submentoplasty to address excess submental fat. Post-market safety data regarding this treatment is currently limited. The objective of this study is to analyze adverse events reported in the Manufacturer and User Facility Device Experience (MAUDE) database.

Study Design: Retrospective Cross Sectional Database Analysis

Setting: US Food and Drug Administration's MAUDE database (2012-2023)

Subject and Methods: The MAUDE database was queried for all reports related to adverse events involving deoxycholic acid using the search terms "KYBELLA" and "deoxycholic acid." Reports were individually reviewed by two reviewers and categorized with special attention to adverse events.

Results: A total of 34 medical device reports were identified from the database query. Thirteen of these reports (21 total events) were included in the analysis after excluding duplicates, unrelated adverse events or events associated with the off-label use of DOC. Reported adverse events include excessive swelling (n=5, 24%), marginal mandibular nerve weakness (n=4, 19%), unsatisfactory aesthetic outcome (n=4, 19%), numbness (n=3, 14%), dysphagia (n=1, 5%), infection (n=1, 5%) and skin necrosis (n=3, 14%). Two patients required hospitalization for skin necrosis management; both had underlying systemic diseases.

Conclusions: Adverse events following DOC injections included excessive swelling, dysphagia, numbness, infection, unsatisfactory aesthetic outcome, facial nerve weakness, and skin necrosis requiring hospitalization and/or surgery. Patient counseling regarding these adverse events should be discussed when offering DOC injections for submental convexity.

BACKGROUND

Submental fat accumulation is a cosmetically bothersome condition. Traditionally this could be treated surgically with submittal liposuction or submenttoplasty. A relatively novel nonsurgical option of subcutaneous infiltration of deoxycholic acid (DOC) have risen substantially in popularity. DOC is a bile acid that contributes to the emulsification and digestion of dietary fat. When injected subcutaneously, the substance works by promoting lysis of the adipocyte cell membrane resulting in apoptosis. DOC as the product KYBELLA (AbbVie Inc.) was approved by the US Food and Drug Administration (FDA) in 2015. While thought to be safe, most adverse events were inflammatory in nature and injection site related reactions such as pain, swelling, bruising, bleeding, numbness, erythema, and induration. The more serious adverse events included temporary marginal mandibular nerve (MMN) injury (up to 4.3%), dysphagia thought due to amount infiltrated (1.9%), skin ulceration thought due to poor surgical technique (0.2%) and injection site alopecia (0.4%). However, with the increase in popularity of DOC injections, it is important to continue to monitor adverse events. This study sought to query the US FDA's MAUDE database (Manufacturer and User Facility Device Experience) for adverse events associated with DOC for submental convexity. The MAUDE database provides a report of suspected device-associated deaths, serious injuries and malfunctions associated with FDA approved medical devices. Further, the FDA mandates certain parties (manufacturers, importers and device user facilities) and encourages others (health care providers and patients) to report such events. The objective of this study is to further elucidate adverse events associated with DOC injections to the submentum after being on the market for the past eight years.

ADVERSE EVENT	NO. (N = 21)	%	REQUIRED SURGERY (N =2)	REQUIRED HOSPITALIZATION (N = 2)
EXCESSIVE SWELLING	5	24		
MMN WEAKNESS	4	19		
UNSATISFACTORY AESTHETIC OUTCOME	4	19		
SKIN NECROSIS	3	14	2	2
NUMBNESS	3	14		
DYSPHAGIA	1	5		
INFECTION	1	5		

METHODS

This study was a retrospective cross-sectional database analysis that was determined by the University of Arkansas for Medical Sciences Institutional Review Board to be exempt from review. The MAUDE database was queried for all reports of adverse events using the search terms "KYBELLA" and "deoxycholic acid" between 2012 and 2023. (web address: https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfmaude/search.cfm; Date of access: April 29, 2023). Data gathered included: event report date, manufacturer, complication type and description of the adverse event. Two reviewers (A.C.G. and A.R.K.) independently reviewed the data. The events were categorized for statistical analysis. Reports were individually reviewed and categorized with special attention to adverse events. Given the nature of the MAUDE database, this study is retrospective and descriptive in nature.

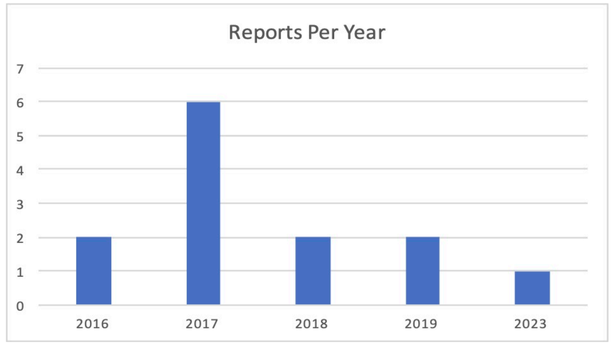
RESULTS

Thirty-four medical device reports were identified from the MAUDE database. Twenty-one of these cases were excluded as they were either duplicates, unrelated adverse events or events associated with the off-label use of DOC. Of the 13 included cases, there were a total of 21 adverse events reported, see Figure 1 for a breakdown of the cases per year. The most morbid of the complications were three reports (14%) of skin necrosis, all requiring surgical interventions and/or hospitalization. Of the three incidents, the two requiring hospitalization did

have suspected concomitant underlying systemic diseases, systemic lupus erythematous and acute myeloid leukemia. The latter required washout and debridement. The third patient with skin necrosis required excision and subsequent laser treatments. There were four events (19%) resulting in unsatisfactory aesthetic outcome; the injections resulted in excess sagging of the skin, asymmetry, suboptimal results, and paradoxical hyperplasia, respectively. There were four events (19%) of marginal mandibular nerve (MMN) weakness, all of which are unknown if they were temporary or permanent. Three reports (14%) noted numbness; two of the three did resolve after several months. The most common adverse event noted was excessive swelling (n = 5, 24%); most of these were not aesthetically pleasing to the patient, one patient had resulting dysphagia from the edema (n =1, 5%). One patient experienced infection at the injection site (n =1, 5%). See Table 1 for a summary of adverse events.

CONCLUSIONS

With the increase in popularity of deoxycholic acid (DOC) injections for submental fat, it is imperative to understand the possible adverse events to aid in patient counseling. Although the majority are noted to be due to injection site reactions, there are potential side effects of higher morbidity. This study found that DOC treatments can result in excessive swelling, dysphagia, numbness, infection, unsatisfactory aesthetic outcome, MMN weakness and skin necrosis requiring hospitalization and/or surgery. Patient counseling regarding the risks and benefits of DOC injections should be discussed when offering DOC for submental convexity



Works Cited

[1] Baumann L, Shridharani SM, Humphrey S, Gallagher CJ. Personal (Self) Perceptions of Submental Fat Among Adults in the United State

[2] ASDS Consumer Survey on Cosmetic Dermatologic Procedures. *asdsnet*. 2021. https://www.asds.net/medical-professionals/practice-resc

[3] Mangat DS, Harmych BM, Been MJ. Rhytidectomy and Facial Liposuction. In Flint P, Haughey B, Lund V et. al., editors. *Cummings Otola*

[4] Sturm A, Shokri T, Ducic Y. Nonsurgical Rejuvenation of the Neck. *Facial Plast Surg Clin North Am*. 2022;30(3):407-417. doi:10.1016/j.fsc

[5] Walker P, Lee D. A phase 1 pharmacokinetic study of ATX-101: serum lipids and adipokines following synthetic deoxycholic acid injections

[6] Vertuan M, Honório HM, Queiroz TP, Santos PL. Is deoxycholic acid able to reduce submental fat and increase patient satisfaction when c

[7] Dayan SH, Schlessinger J, Beer K, et al. Efficacy and Safety of ATX-101 by Treatment Session: Pooled Analysis of Data From the Phase

[8] McDiarmid J, Ruiz JB, Lee D, Lippert S, Hartisch C, Havlickova B. Results from a pooled analysis of two European, randomized, placebo-

[9] Humphrey S, Cohen JL, Bhatia AC, Green LJ, Green JB, Bowen B. Improvements in Submental Contour up to 3 Years After ATX-101: Effi

[10] Frequently Asked Questions: Have questions about Kybella? Find answers here. MyKybella.com. 2023. https://www.mykybella.com/frequ

[11] Farina GA, Cherubini K, de Figueiredo MAZ, Salum FG. Deoxycholic acid in the submental fat reduction: A review of properties, adverse

[12] Full Prescribing Information. Rxabbvie.com. March 2023. https://www.rxabbvie.com/pdf/kybella_pi.pdf. Accessed May 3, 2023.

[13] Shridharani SM, Chandawarkar AA. Abstract: Alopecia in Male Patients Treated with ATX-101 (Deoxycholic Acid) for Submental Fullness

[14] Issa NT, Kaiser M, Martinez-Velasco A, Tosti A. Alopecia After Cosmetic Injection Procedures: A Review. *Dermatol Surg*. 2022;48(8):855-

[15] Shridharani SM, Tisch GM. Commentary on: Improvements in Submental Contour Up to 3 Years After ATX-101: Efficacy and Safety Follo