MYCOBACTERIUM CHELONAE INFECTION FOLLOWING LIPOSUCTION

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INTRODUCTION

This report describes the investigation of a case of *Mycobacterium chelonae* infection following liposuction. Any known or suspected outbreaks of any disease are required to be immediately reported to public health[1]. After notification of this case, the Acute Communicable Disease Control Program (ACDC) at the Los Angeles County Department of Public Health (LAC DPH) conducted a case investigation, case finding, medical record review, environmental investigation, and laboratory investigation to determine if there were other cases of post-surgical atypical mycobacterial infections after receiving liposuction.

METHODS AND RESULTS

Case investigation: On November 12, 2008 an infectious disease (ID) physician at a local area hospital reported to ACDC a patient who had abdominal liposuction on August 30, 2008 at an outpatient medical office and was found to have subcutaneous abscesses with drainage from the anterior abdominal wall. The patient noticed "hard" red areas at the incision sites four weeks post-procedure, and first noticed drainage from the incision sites 6 weeks post-procedure. The patient was treated initially as an outpatient by the physician who performed liposuction with oral ciprofloxacin and telithromycin and subsequently intravenous (IV) cephazolin as an outpatient without any improvement. The patient was admitted to the hospital on November 4, 2008 and an aspirated subcutaneous abdominal abscess specimen obtained by the ID physician on November 7, 2008 showed 3+ acid-fast bacilli (AFB) on smear and culture grew *Mycobacterium chelonae*. The patient, who was interviewed by ACDC, had stated that the wounds were kept clean post-liposuction and denied immersing the wounds in water after the procedure.

Setting: Liposuction was being performed by one physician (board-certified in Internal Medicine with a valid license from the California Medical Board) in a single outpatient medical office. The office had 1 procedure room that was used for liposuction, flexible sigmoidoscopy, and esophagogastroduodenoscopy. There were a total of six(6) staff consisting of three (3) medical assistants (MA), two (2) oriental medical doctors, and the physician. The office staff and physician did not recall any differences in cleaning/sterilization of equipment or liposuction procedure steps during time of the case-patient's procedure compared to other patients who had liposuction.

Case finding: On November 13, 2008 a line list was obtained of all patients who had liposuction since May, 2008 when liposuction surgery first starting being performed by this physician at this outpatient office. Twenty-seven patients underwent 28 liposuction procedures from May 30, 2008 – November 15, 2008 (14 procedures done prior to the case-patient's procedure date of August 30, 2008 and 14 were done since August 30, 2008; one patient had liposuction done twice at different anatomic sites on different dates).

Medical record review was conducted on November 19, 2008. There was no documentation in the medical records of which staff were present during the liposuction procedure but the physician stated that it is usually himself, plus one other MA who is "sterile" and then one or two other MAs who are "non-sterile" documenting fluid aspirate volumes and times. Review of the liposuction procedures performed from May 30, 2008 through November 15, 2008 showed that all 27 patients followed up after their liposuction procedure within 1 week for stitch removal. After the one week stitch removal followup, patient follow-up varied from one month to three months post-procedure. Six patients had at least three months follow-up evaluation documented in the medical records, there was no documentation of infection at the liposuction wound sites. Sixteen patients between May 30, 2008 and October 4, 2008 had less than three months follow-up documented in the medical records. Five patients had liposuction performed after October 4, 2008 and had not yet reached their 2 and 3 month follow-up visits. Only one other patient (excluding the case-patient) who had liposuction since May 2008 was treated with antibiotics post-procedure. This patient was treated with antibiotics 1 week post-procedure but had no signs of infection at one month post-procedure follow-up according to the medical record review; telephone interview was conducted by ACDC with this patient, who reported no current signs or symptoms of infection. Of note, medical charting and phone conversations written in the medical records by medical assistants were in a

foreign language. Post-liposuction wound care instructions (e.g. do not bathe, touch wound, swim, etc.) were given verbally to patients but no written instructions were handed out for the patients to take home after the procedure.

Follow-up telephone interviews were conducted by ACDC on December 2 and 3, 2008 with the 16 patients who had received liposuction from May 30, 2008 through October 4, 2008 and had less than three months post-procedure follow up evaluation. None of these patients reported signs or symptoms of wound infection (e.g. fever, redness, "bumps" or nodules, drainage) at their liposuction sites and none had seen another physician due to concerns about their liposuction wound sites.

Because positive AFB tests are reportable under California Code of Regulations Title 17, Section 2505 to the LAC DPH Tuberculosis Control Program (TBC), ACDC contacted TBC to look for any positive AFB results from surgical wound sites. TBC's database was queried and did not show any other laboratory results of rapidly growing mycobacteria from surgical wound sites expect for that of the initial case-patient.

Environmental Investigation: On November 19, 2008 ACDC conducted a site visit consisting of a walk-through and interviews with the physician and office staff regarding the liposuction procedure including equipment cleaning and sterilization. The procedure room where liposuction was being performed was clean and orderly. There was one sink in the procedure room. Areas for cleaning/disinfection of equipment were separate from sterile equipment storage and medication preparation. The medical office did not have ice machines or water baths.

There was 1 liposuction machine (VASER®) bought new since May 2008, 1 tabletop steam autoclave (Validator 8®- Pelton & Crane Co.) several years old which had not undergone any repairs or preventive maintenance checks. Skin markings for liposuction preparation were done using sterile, single use markers that were included in sterile one time use procedure packs. The liposuction procedure was performed under local anesthesia using the tumescent technique under local anesthesia where normal saline IV bags are mixed with epinephrine (single use aliquots), lidocaine (multidose vial), and bicarbonate (multidose vial). The tumescent infusion solution was disposed of after each patient use. An open date was written (November 3, 2008) on one opened multidose lidocaine vial and there were no other open medication vials.

Single-use, disposal liposuction equipment consisted of the suction tubing, infusion tubing, and vacuum canisters. Reusable liposuction equipment consisted of skin ports, infiltrator cannulas, ultrasonic probes, suction cannulas (Figure 1), handpiece for cannulas, connectors, and a wrench (used to connect the handpiece). Reusable liposuction equipment was cleaned with soap and tap water with a bristle brush, then disinfected in CIDEX Plus™ (3.4% alkaline glutaraldehyde) solution by soaking for 30 minutes, then air dried, and steam-pressure autoclaved.

Infection Control: Office MA staff were trained by the manufacturer on cleaning, disinfecting, and sterilizing the liposuction equipment in May 2008 when the machine was initially purchased. Cleaning, disinfection, and sterilization of liposuction equipment were usually done primarily by one MA. Office staff indicated that sterilized equipment not used within two weeks, is re-sterilized prior to use.

The office did not have any written infection control policies or hand hygiene policies. The office did not have the manufacture's instructions for VASER® liposuction equipment cleaning, disinfection, and sterilization. There were no written procedures or logs for cleaning/disinfection of liposuction equipment and no written procedures or logs for autoclave sterilizing. The office did not have the manufacture's instructions for the autoclave and had never used biological indicators (monitors the effectiveness of the steam sterilization process) to assure sterilization as recommended by the autoclave manufacture's instructions (which were later obtained by ACDC). Indicator tape (adhesive tape used in autoclaving to indicate whether a specific temperature and pressure has been reached) was used on instrument bags and the physician and office staff were informed by ACDC that the indicator tape only showed that only a certain temperature was reached, not necessarily adequate sterilization.

The following was also noted: staff indicated they combine left over small 4 oz open bottles of povidone-iodine together, if needed, into larger containers; staff used cotton balls in small plastic containers moistened with alcohol for wiping tops of multidose vials instead of individual sterile alcohol wipes; MAs

describe assisting the physician in mixing and injecting intravenous cephazolin used for patients but it was unclear whether they had a direct role in administering any IV therapy; the physician indicated that during the liposuction procedure, he would insert the cannula into 70% isopropyl alcohol from an open bottle (non-sterile) and flush the suction cannula to dislodge tissue from ports then insert the cannula back into the patient for further suctioning.

Laboratory Investigation: The following environmental samples were taken for AFB testing: procedure room tap water, swabs from inside the faucet/aerator, autoclave reservoir water, autoclave distilled water, fresh CIDEX Plus™ disinfectant from an open container, opened containers of povidone-iodine gel, instrument cleaning brush rinse, and a container of cotton balls soaked in alcohol.

Procedure room tap water was AFB smear negative; culture grew *Mycobacterium gordonae*. The faucet and aerator swabs had 2+ AFB and 1+ AFB, respectively, and cultures for both grew *M. gordonae.* The remainder of the environmental specimens were AFB smear and culture negative.

DISCUSSION

Atypical mycobacterial infections have been associated with post-procedure skin and soft tissue infections including after cosmetic surgeries and outbreaks have been documented [2,3,4,5,6,7,8]. Potential sources of contamination reported in the literature were inadequate sterilization and rinsing of liposuction equipment with tap water, contaminated methylene blue used to mark incisions for face lifts, and contamination of the quaternary ammonium solution used to disinfect liposuction instruments [3,6,7,8]. *M. chelonae* can be found widely distributed in the environment in soil and water, including tap water. Facial procedures, abdominoplasty, liposuction, breast reduction or augmentation, mammoplasty, and nipple piercing have all been associated with cases of post-procedure infection with rapidly growing mycobacteria. Increased use of alternative medicine providers and increased numbers of procedures performed in freestanding surgical centers that are not routinely monitored by infection control committees or equivalent oversight bodies may be contributing factors [2].

Our investigation of this case of atypical mycobaterial wound infection following liposuction shows that it was likely an isolated occurrence as 100% case finding and AFB surveillance did not reveal any other infections. Although no other cases were found, proper cleaning, disinfection, and sterilization of liposuction equipment and other infection control issues at the office were of concern. The office did not have written procedures for processing reusable liposuction equipment, did not keep logs of using the autoclave for sterilization, and were not performing preventive maintenance checks or verification of sterility on the autoclave as recommended by the manufacturer.

In general, liposuction instruments by their nature (Figure 1) may be difficult to clean and proper sterilization steps need to be undertaken[9]. Decreasing lumen diameter and length are factors that affect the efficacy of sterilization and can impair sterilant penetration[10]; liposuction cannulas may retain unseen tissue posing sterilization difficulties[9].

Risk factors causing or contributing to infectious disease outbreaks in the outpatient settings that have been identified include: inadequate cleaning, disinfection, sterilization, and storage of instruments and equipment; inappropriate use of barrier equipment such as gloves by healthcare personnel; inadequate hand-washing practices by healthcare workers; failure to use aseptic technique; and lack of familiarity with established infection control practices on the part of ambulatory care personnel. Also, in the outpatient setting, the responsibility for implementing an infection control program is usually not assigned to a specific individual[11]. Following our site visit, our concerns regarding the absence of infection control procedures and the absence of equipment cleaning and sterilization procedures were discussed verbally with the physician. A letter was sent to the physician on December 8, 2008 summarizing the findings and making recommendations to improve his practice. These included developing an infection control policy; keeping written procedures and logs of cleaning, disinfecting, and sterilization procedures which are consistent with the manufacture's recommendations; performing preventive maintenance on the autoclave according to the manufacturer's instructions; and using biologic indicators to assure sterilization.

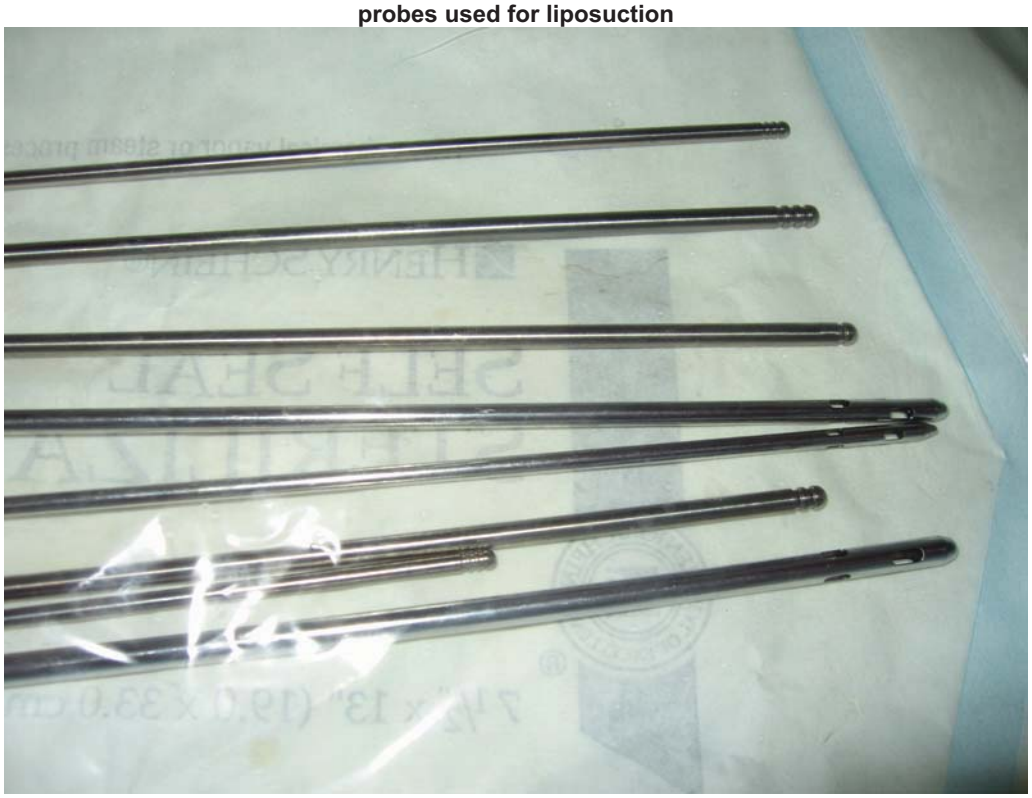
Regarding antiseptics and sterilization, we recommended the following: utilize single-use alcohol prep pads for cleaning multidose vials instead of cotton balls soaking in alcohol containers; avoid mixing/combining antiseptic solutions unless it is according to the manufacturer's instructions; and while performing liposuction, to only use sterile solutions or irrigations (not non-sterile bottles of isopropyl alcohol) to flush ports on previously sterilized liposuction equipment.

We also recommended that the physician provide patients with written, take home post-liposuction wound care instructions in the patient's preferred primary language which include instructions on avoidance of bathing or soaking wounds in water for the instructed time period. Additionally, the physician was instructed to review the duties of medical assistants; MAs may not place the needle or start and disconnect the infusion tube for IV therapy as these procedures are considered invasive, and therefore, not within the medical assistant's scope of practice. Medical assistants are not allowed to administer medications or injections into the IV line[12].

Although there have been many cases of atypical mycobacterial infections reported in the medical literature due to contamination during liposuction or other cosmetic procedures, a thorough investigation did not reveal any other cases nor a source for *M. chelonae* associated with this office. It is possible that the case-patient acquired the infection through an environmental source outside this particular office. However, since there were several infection control issues of concern and because the incubation period for atypical mycobacterial infections can be prolonged (the range has been reported to be from 2 weeks to 20 weeks [2]), the physician was reminded to be vigilant for any further wound infections in patients post-liposuction and to notify ACDC of any patient with wound infection post-liposuction.

Plastic surgeons and dermatologists are the types of physicians who most often perform liposuction, but any licensed physician may perform the procedure. While some physicians' professional societies recommend standardized training for such procedures, there is no standardized training required for liposuction[13]. Outpatient medical offices are also not routinely monitored by oversight bodies or infection control committees as are hospitals and outpatient surgical centers[14]. Due to this and other factors [2,15], lapses in infection control specifically in these outpatient settings may result in outbreaks [11,14,16]. Our findings during the investigation at this medical office further highlight the unaddressed infection control monitoring problems in outpatient settings.

Figure 1: Close up view of ports of reusable suction cannulas (with openings at the right end) and ultrasonic probes used for liposuction



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