Postoperative seroma formation after abdominoplasty with placement of continuous infusion local anesthetic pain pump

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The most common complication after abdominoplasty is seroma formation. The incidence of seroma formation in abdominal procedures as a whole, including abdominoplasty, panniculectomy and transverse rectus abdominis myocutaneous flap abdominal donor sites, ranges from 1% to 38%. A recent concern among surgeons is the possibility of a causal relationship between the use of continuous infusion devices such as local anesthetic pain pumps and the development of seromas. A case of postoperative, persistent, recurrent seroma formation after abdominoplasty with the use of continuous infusion local anesthetic pain pump is presented. After several attempts at aspiration and drain catheter placement, only open surgical excision of the seroma cavity was found to be definitively effective in treating the development of seroma.

Key Words: *Abdominoplasty; Local anesthetic; Pain pump; Seroma*

Abdominoplasty has become a widely popular procedure, with the number of abdominoplasty procedures increasing 55% from 2000 until 2006 (1,2). The most common complication after abdominoplasty is seroma formation (1,3). The incidence of seroma formation in abdominal procedures as a whole, including abdominoplasty, panniculectomy and transverse rectus abdominis myocutaneous flap abdominal donor sites, ranges from 1% to 38% (1,4-20). This incidence appears to increase with patient obesity, wide undermining, extensive use of cautery dissection, use of sharp liposuction cannulas, and the weight of skin excised (1,8,13,20-26). A recent concern among surgeons is the possibility of a causal relationship between the use of continuous infusion devices such as local anesthetic pain pumps and the development of seromas.

We report a case of postoperative, persistent, recurrent seroma formation after abdominoplasty with the use of continuous infusion local anesthetic pain pump.

CASE PRESENTATION

A 61-year-old African-American woman presented with complaints of abdominal laxity and excess abdominal skin. She had three pregnancies in the past and had recently achieved and maintained a 13.5 kg weight loss through diet and exercise. She had remained stable at her current weight for over one year preoperatively. Her pertinent medical history included iron deficiency anemia, hypertension, obesity, peptic ulcer disease, hypothyroidism, diabetes and hyperlipidemia. She denied any use of alcohol, tobacco or illicit substances.

Formation d'un sérome post-opératoire après abdominoplastie avec installation d'une pompe anesthésique locale pour perfusion continue

La complication la plus fréquente après une abdominoplastie est la formation de séromes. Dans l'ensemble, l'incidence des séromes lors d'interventions abdominales varie de 1 à 38 %, y compris lors de l'abdominoplastie, de la panniculectomie et dans les sites abdominaux donneurs de lambeaux myocutanés du transverse de l'abdomen. Les chirurgiens se sont récemment inquiétés de la possibilité d'un lien causal entre l'emploi d'appareils pour perfusion continue, comme les pompes anesthésiques locales, et la formation de séromes. On présente ici un cas de sérome post-opératoire persistant et récurrent après une abdominoplastie avec emploi d'une pompe anesthésique locale pour perfusion continue. Après plusieurs tentatives d'aspiration et la pose d'un drain, seule une excision chirurgicale ouverte du sérome a permis de traiter définitivement ce cas.

The patient underwent an abdominoplasty with vertical and oblique plication of the rectus abdominis fascia. Dissection was carried out at the level of the abdominal fascia just under Scarpa's fascia. Catheters to a continuous infusion local anesthetic pain pump system (On-Q, I-Flow Corporation, USA), as well as two Jackson-Pratt drains were placed directly on the surface of the rectus abdominis fascia. The pain pump reservoir was filled with the recommended 400 mL of 0.25% bupivacaine, allowing a continuous infusion of 4 mL/h (2 mL/h/catheter $\times$ 2 catheters) of local anesthetic to aid in postoperative pain control.

The patient was kept overnight for observation, and subsequently discharged the following day without incident. On postoperative day 5, the pain pump reservoir was empty and the catheters were removed. The Jackson-Pratt drains were discontinued on postoperative days 9 and 14, at which point each drain's cumulative output was less than 30 mL per 24 h period, for a minimum of three consecutive days.

During the first postoperative month the patient developed a suspected seroma supraumbilically, but no fluid could be evacuated. Despite multiple failed aspiration attempts on multiple office visits, the fluid collection persisted. Two months after her initial operation the patient underwent operative placement of a drain under local anesthesia and sedation. Intraoperatively, 100 mL of fluid was removed, and a Jackson-Pratt drain was placed. The drain was removed postoperatively once the above-mentioned removal parameters were met on postoperative day 10. An abdominal compression garment was applied for two months.

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Figure 1) Patient six months after abdominoplasty with upper abdominal fullness noted on anterior view (left) and lateral view (right), despite multiple drainage procedures

Figure 2) Computed tomography scan revealing an ovoid upper abdominal fluid collection measuring 8.2 cm × 2.7 cm × 5.5 cm with a well-defined wall

Figure 3) Ultrasound revealing a multiloculated cystic structure in the midline upper abdomen measuring 7.1 cm × 3.4 cm × 1.0 cm

Figure 4) Surgical excision of the midline upper abdominal multiloculated seroma cavity. Views of intact seroma capsule (left), and multiloculated interior (right)

Figure 5) Post-operative view after open excision of the midline upper abdominal seroma on anterior view (left) and lateral view (right)

The patient re-presented with recurrent upper abdominal fullness six months postoperatively (Figure 1). Computed tomography scan revealed a large fluid collection (Figure 2). During the seventh and eighth months after the initial procedure, fluid was aspirated from the seroma cavity on four separate clinic visits. Bacterial and fungal cultures were obtained but were negative for growth. Ultrasound evaluation demonstrated a multiloculated cystic structure in the upper abdominal midline (Figure 3).

Eleven months after her initial procedure, open drainage and resection of a 10 cm × 6 cm seroma cavity was performed (Figure 4), along with Jackson-Pratt drain placement. There has been no fluid collection recurrence to date, indicating that surgical excision of the seroma cavity was the critical step in successful treatment of this patient's persistent, recurrent, postoperative seroma (Figure 5).

DISCUSSION

Seroma formation is the most common complication after abdominoplasty (1,3,7,8,13). Its incidence following abdominoplasty ranges from 1% to 38% (7,8,13). The incidence appears to increase with patient obesity, wide undermining, extensive use of cautery dissection, use of sharp liposuction cannulas and the weight of skin excised (1,8,13,20-26). Pathophysiology for seroma formation is thought to be related to the disruption of lymphatic and vascular channels (27).

The placement of drainage catheters has been used to prevent formation of seroma. Other techniques used to prevent seromas after abdominoplasty include quilting sutures, progressive tension closures, and preserving layer of fascia immediately anterior to rectus sheath and external oblique fascia (ie, innominate fascia of Gallaudet) (28-33). The use of quilting sutures and progressive tension sutures are both found to be effective, but with efficacy similar to catheter drainage alone (28-30). The efficacy of preservation of fascia immediately anterior to the rectus sheath and external oblique fascia (ie, innominate fascia of Gallaudet) to prevent seroma formation (31-33) is not well studied. A continuous infusion local anesthetic pain pump was used in this patient, which would support the possibility of a correlation between the use of continuous infusion pain pumps and the development of seroma. However, little data currently exist to confirm this correlation (1).

Options for treating seromas include needle aspiration, sclerotherapy, placement of a seroma catheter and excision of the seroma cavity. Few studies have demonstrated the

effectiveness of each approach in treating seromas in post-abdominoplasty patients. Shermak et al (26) propose including each of these techniques as part of an algorithmic approach to treat seromas after body contouring surgery.

CONCLUSIONS

Seroma formation is a common complication occurring after abdominoplasty, often requiring multiple interventions to fix the problem. In our case study, seroma formation occurred after abdominoplasty with use of continuous infusion local anesthetic pain pump. After several attempts at aspiration and drain catheter placement, only open surgical excision of the seroma cavity was found to be definitively effective in treating the development of seroma.

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