

## CASE REPORT

# Leech therapy of nipple-areolar complex (NAC) congestion in reduction mammoplasty: A case report

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**Abstract**

Leech therapy is a safe, easy-to-use, cost-effective traditional treatment to save re-attached body parts and flaps in reconstructive plastic surgery especially in cases with blood circulatory problems.

**KEYWORDS**

congestion, hirudotherapy, leech therapy, mammoplasty, nipple-areolar complex

## 1 | INTRODUCTION

Leech therapy is a traditional treatment that currently used in plastic surgery and in some blood circulatory problems. We presented a case of NAC congestion and impending nipple necrosis followed by reduction mammoplasty who was treated with leech therapy with good clinical outcome without any complication.

One of the most important complication after reduction mammoplasty is partial or total nipple necrosis. It can be caused by ischemia due to arterial insufficiency or venous congestion due to impaired venous drainage at nipple-areolar complex (NAC) This congestion can result micro-thrombosis and ischemia and may eventually lead to nipple necrosis. NAC necrosis has been reported in 2% of breast reduction cases and in 1% of mastopexy

cases. There are many risk factors for NAC ischemia and necrosis. It occurs more frequently in cases involving large reductions (resection >1000 g), where a long pedicle (>10 cm mobilization) is created to carry NAC perfusion, and folding during closure can stress the circulation.<sup>1</sup>

Impending nipple necrosis is dread of every plastic surgeon. If the nipple-areola appears to be blue and engorged postoperatively, several stitches should be removed. If this produces no change in color, the patient may have to return to the operating room to rule out torsion of the pedicle or underlying hematoma. If, despite these measures, the NAC still shows marked obstruction, then it should be removed and grafted. Sometimes, venous obstruction is mild and can be reversed with some alternative medicine interventions such as medicinal leech therapy.<sup>2</sup>

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Medicinal leech therapy or hirudotherapy is a traditional, complementary, and integrative treatment. The first application of this technique was painted in the hieroglyphics from the ancient Egypt over 3500 years ago.<sup>3</sup> In the past, leeches have proved to be an effective treatment for a number of conditions including battle wound treatment. Currently, Medical leeches are used in plastic surgery and in some blood circulatory problems. The history of using medical leeches in plastic surgery returns to 50 years ago.<sup>4</sup> In this way, one or more leeches are attached to the skin of problematic area and the purpose is to gain potential utilities of leech saliva that is secreted while the leeches are feeding. During feeding, leeches secrete a complex mixture of different biologically and pharmacologically active substances into the wound that the most important one is named hirudin. So, hirudin is sometimes used to describe all the active constituents in the leech saliva.<sup>5</sup>

In clinical practice, the area that needs to be treated has to be cleaned with a normal saline.<sup>6</sup> Then, some leeches are placed on the problematic position. As the leech bite continues, it reduces congestion due to the anticoagulant effect of leech saliva, which contains thrombin inhibitor hirudin, apyrase, collagenase, hyaluronidase, factor Xa inhibitor, and fibrinase I and II.<sup>7</sup> When the leeches have ingested enough blood, they will fall away by themselves.<sup>8</sup> In this article, we presented a case of NAC congestion and impending nipple necrosis followed by reduction mammoplasty who was treated with leech therapy with good clinical outcome without any complication.

## 2 | CASE REPORT

A 23-year-old Persian female patient presented to the surgery department for elective bilateral breast reduction mammoplasty. She was a healthy woman without family history of underlying diseases although her BMI was 30 kg/m<sup>2</sup>. She was unmarried and had no breastfeeding history. The distance between NAC and suprasternal notch (SSN) was 33 and 34 cm for right and left breasts, respectively. With using supramedial flap technique, about 900 g breast tissue resection was done bilaterally and the distance between NAC and SSN reduced to 19 cm.

Before mammoplasty, the patient received 1 g cefazolin as antibiotic prophylaxis. Immediately after mammoplasty and in operation room, the left NAC was a little pale in comparison with the right one. So with diagnosis of circulatory compromise, TNG solution was used for promoting drainage of blood on the left NAC. As a result, the blood flow was improved and the patient was transferred to the ward with the normal appearance of NAC (Figure 1).

After one day, the patient discharged with normal appearance and color of NAC.



**FIGURE 1** Normal appearance of NAC immediately after surgery

On the second day after surgery, the color of NAC got darker and displayed venous congestion without hematoma (Figure 2). We started aspirin for the patient and waited 12 h, but the NAC did not improve and local tissue swelling increased. After failure of these conventional treatment modalities, we decided to use leeches to improve venous congestion. The patient was informed about the benefits and potential risks of the leech therapy. She agreed to undergo leech therapy. Leeches were thoroughly washed with deionized water before use. The area to be exposed to leeches was cleaned with sterile distilled water. The leeches were placed on the darker area using a thick layer of gauze.

Left NAC was punctured with a sterile needle because oozing blood stimulated the leeches to feed. Five leeches had been placed on the left NAC. When the leeches had ingested enough blood, they spontaneously detached and NAC returned to normal appearance (Figure 3). In order to prevent infection with *Aeromonas hydrophila*, prophylactic antibiotics were started half an hour before leech therapy (Ciprofloxacin 500 mg, BD and metronidazole 500 mg, Q8 h, for 10 days). There was about 5% of skin necrosis, which was improved gradually (Figure 4). She was treated with leech therapy with good clinical outcome without any complication (Figure 5) and (Figure 6).

## 3 | DISCUSSION

Intravenous NAC congestion during breast reduction surgery is a relatively uncommon complication. Larger reduction weights have been associated with higher rates of venous congestion.<sup>9</sup> Venous congestion can lead to NAC necrosis or conversion to a free nipple graft, which reduces lactation and sensation viability.<sup>10</sup>

Causes of congestion include inadequate preservation of venous drainage, pedicle constriction secondary to



**FIGURE 2** Hematoma-free venous congestion in the NAC on the second postoperative day



**FIGURE 5** After leech therapy with good clinical outcome without any complication



**FIGURE 3** Feeding leeches from the congested area and returning the NAC to normal appearance



**FIGURE 4** Leech therapy in process



**FIGURE 6** Two weeks after leech therapy

tight inset, or hematoma formation. Furthermore, typical comorbidities such as smoking, diabetes, and obesity increase risk for venous congestion. Weight loss, smoking cessation, blood pressure optimization, and diabetic control all reduce the incidence of NAC congestion.<sup>9</sup> In

this patient, BMI was 30 but there were no the other risk factors.

After NAC congestion diagnosis, conservative measures should be attempted first. The surgeon should explore for a hematoma and release tight peri-areolar sutures. When noted postoperatively, nitropaste and leeches can be used for a struggling NAC before necessitating a return to the operating room. Some studies have used up to 6 leeches per treatment, whereas others have shown adequate results with just 1 leech.<sup>11-13</sup> We used 5 leeches to reduce congestion for once time.

However, there were no complications in this case, but the major complications of hirudotherapy are psychological stress, induced anemia, and infection.<sup>14</sup> Infection starts most of the time during the first 10 days, but in some cases, infection can appear a few weeks after leeching.<sup>15</sup> The most common germ is *Aeromonas hydrophila* but the other pathogens may cause wound infections following



leeching.<sup>16</sup> Ciprofloxacin is the most recommended prophylactic antibiotic for leech therapy because studies have consistently shown 100% sensitivity of *Aeromonas* strains isolated from medicinal leeches.

Therefore, hirudotherapy is a safe, easy-to-use, beneficial, and cost-effective treatment modality to save reattached body parts and flaps in reconstructive plastic surgery. Although hirudotherapy is not a treatment method by itself, it can be an important part of a multidisciplinary approach for patients that do not respond to classic treatment.

### CONFLICT OF INTEREST

The authors declare that they have no conflict of interest regarding the publication of this case report.

### AUTHOR CONTRIBUTION

Narges Vasei designed the study and wrote the initial draft of the manuscript. Katayoun Jahangiri contributed to analysis and interpretation of data, and assisted in the preparation of the manuscript. All other authors contributed to data collection and interpretation, and critically reviewed the manuscript. All authors saw and approved the final version of the manuscript. All authors approved the final manuscript.

### CONSENT

Obtained.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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