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Management of oedema in non-surgical aesthetic practice

Seriousness of complication		**Frequency of complication**	
Minor complication	X	Common	X
Worrying complication		Occasional	
Moderate complication		Infrequent	
Serious, but not major		Rare	
Major complication		Very rare	

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Definition:

Oedema is the accumulation of an excessive amount of serous fluid in or around the cells, tissues or serous compartments of the body. Oedema can be localised to a region or more widespread and can be caused by various triggers such as trauma, medication or systemic illness. Lymphoedema occurs because of obstruction of lymphatic vessels or lymph nodes and the subsequent build-up of lymph in the affected region.

Angioedema is the rapid swelling of the dermis, subcutaneous tissue and mucosa. It can be severe, and life threatening and should be treated as a medical emergency (See ACE Group Guideline on Anaphylaxis) although angioedema following dermal fillers is extremely rare[1]. Less severe cases can cause swelling which can last several weeks, this may be just present at the treatment site or may be more generalised.

Introduction:

Oedema is a very common side-effect when performing dermal filler injections and is usually relatively mild and self-limiting. Patients should be counselled about the risk of oedema and swelling prior to treatment. The development of oedema is dependent on many factors:

- Patient factors (Age, lifestyle factors, medical conditions, pre-existing lymphatic compromise[2])
- Medication (NSAIDs, hormonal treatments, calcium channel blockers, certain vitamins[3])
- Product factors (For dermal fillers, type of product, area treated, volume injected[4])
- Treatment factors (The amount of trauma caused by the treatment process, for example, when injecting dermal fillers, injection technique and speed of injection can result in greater swelling)

Incidence:

Generally, the greater the insult to the skin caused by an aesthetic treatment, the larger amount of oedema that will develop. Swelling following dermal filler treatment is likely to be in the order of 10 - 50%, although all patients are likely to develop a degree of oedema by the nature of the treatment. The incidence of swelling following the injection of Restylane using patient diaries was 87% in a randomised, double blind, multicentre study[5].

Thermoablative treatments including plasma sublimation, electrocautery and a range of laser devices commonly lead to oedema dependent on the degree of tissue disruption and can be mild to severe requiring treatment.

Rarely, periorbital and/or eyelid oedema can be experienced when injecting the lateral orbicularis oculi muscle with botulinum toxin for the treatment of the crow's feet. The incidence has been reported at 1%[6] and is likely due to the weakening of the sphincter muscle which

has a physical action on drainage of fluid in this region.

Signs and symptoms of oedema:

Oedema is characterised by the presence of swelling within or beneath the skin, it may be pitting (holds an indentation after digital pressure) or non-pitting (springs back into place after applying pressure). Oedema may be tense due to the position and anatomical structures restricting the swelling, but often it is soft and easily compressible to palpation.

It has a different consistency and is distinguishable from the presence of a foreign body (such as dermal filler) which tend to be more defined and firm. If the area is red and warm, infection needs to be considered (See ACE Group Guideline on Acute Skin Infection).

Areas of caution:

Oedema can occur anywhere treatment is performed however the areas of the face that appears specifically prone to swelling are the lips, periorbital[1] and malar regions[2,4,7].

Tissue oedema may be unilateral and quite pronounced especially with some hydrophilic hyaluronic acid dermal fillers and the practitioner must be cautious to ensure that they do not mistake oedema for dermal filler resulting in asymmetry[8].

Minimising the risk of oedema:

1. Ensure a full medical history is taken to include any pre-existing conditions, medications taken including contraception or HRT (oestrogen increases the risk of oedema), aspirin, non-steroidal anti-inflammatory medications and supplements (Vitamin E, ginger, ginseng, ginkga biloba, garlic, kava kava, celery root and fish oils)[3].
2. Consent should include a full explanation on the risks of side effects and complications and the patient must be informed of any injection site reactions[3].
3. Select the appropriate dermal filler for the indication being treated in accordance with the manufacturer's guidelines.
4. Due to the hydrophilic nature and osmolality of hyaluronic acids, certain brands can cause more oedema than others[9].
5. The less trauma during the procedure, the less risk of swelling. Although oedema is, in part, technique dependent[2,4] it is, at varying degrees, so common it should often not even be considered an actual complication[10]. Oedema is likely to be more significant when tissue planes are traumatised by fanning techniques, injection of a large volume of filler in one location and by injecting product too quickly[2].
6. Apply gentle massage after treatment but avoid vigorous massage which may increase tissue trauma and contribute to swelling[11].
7. The most common inflammatory reactions such as swelling, tenderness or redness are easily managed with the application of ice[12]. Although application of ice or cool packs is often recommended as a measure to reduce swelling, there is no evidence that it makes a difference although patient satisfaction is increased.
8. Direct injection of a local anaesthetic into the treatment area will lead to secondary oedema which can alter contour and affect treatment[13].
9. Avoid extremes of temperature (hot or cold) or altitude within the first 48 hours to limit the persistence of oedema.

The amount of swelling is also dependent on the product used and hyaluronic acid fillers with high molecular weights and less cross-linking cause more oedema[14].

Malar Oedema[2,15]

Malar oedema is the collection of fluid in the infraorbital region and is a common complication following the injection of dermal filler into the tear trough with an incidence between 11%[16] – 25%[17] with oedema lasting an average 5.4 months following the injection of hyaluronic acid into this region[17]. It can also occur following other periorbital treatments such as skin peels, laser treatments, carboxytherapy and with certain skin care products.

This region is particularly prone to oedema due to the rather impenetrable malar septum which divides the superficial suborbicularis oculi fat into a superficial and deep compartment. Due to this connective tissue septum, the superficial fat compartment already has a compromised lymphatic drainage and is the reason that puffy eyes can develop after a poor night's sleep or after crying. Injection of dermal fillers superficial to the malar septum may further impede lymphatic drainage and produce a malar oedema. Deeper injections, particularly with too great a volume and with a viscous product, can cause direct compression of the lymphatic vessels and again an undesirable malar oedema.

The risk of malar oedema following a dermal filler treatment can be reduced by correct patient selection (ask about previous episodes of malar oedema or if they suffer with puffiness around their eyes), using a filler of low elasticity and viscosity, limiting the volume injected and by injecting either supraperiostally or at the immediate subcutaneous level above the area prone to lymphatic compromise (however the risk of causing a Tyndall effect needs to be considered if injecting superficially)[2].

Treatment options for malar oedema include head elevation, cold compresses, manual compression and lymphatic drainage several times a day and oral steroids. If these fail to resolve the problem, hyaluronidase should be used if the cause of the malar oedema is the injection of an hyaluronic acid filler[2].

Treatment of oedema:

Oedema < 2 weeks duration

Oedema occurring within the first two weeks should be managed expectantly. Even quite significant oedema will settle down within a relatively short time. Ice or cool packs have not been proven to reduce swelling however many leading practitioners would advocate the use of ice packs[12,18] or warm compresses to minimise erythema, oedema and tenderness[19]. Consider gentle massage over the area which may improve lymphatic drainage and the patient can do this at home. Watchful waiting[19], reassurance and appropriate follow up are usually all that is required and most cases of post injection, trauma related oedema dissipate within one week[2]. Initial moderate swelling may respond to non-steroidal anti-inflammatory drugs (NSAIDs), such as ibuprofen 400mg three times a day for 2 to 3 days[1].

There is little evidence to support the use of oral steroids in the management of swelling in the acute phase unless the oedema is severe or if angioedema develops. A single intravenous bolus of 1g

methylprednisolone given intra-operatively during facial surgery resulted in less oedema and a shorter duration of swelling as well as less requirements for analgesia with no adverse events seen[20]. One author states that oedema secondary to cryotherapy can be partly inhibited by a potent topical steroid immediately following treatment[7].

Oedema may arise due to an antibody-mediated Type I hypersensitivity reaction. This usually presents quite rapidly after treatment and is often due to exposure of the tissue to a foreign material such as dermal filler. Swelling may be localised or generalised and mild to severe. IgE sets off an inflammatory cascade and mast cell degranulation leading to the release of histamine, cytokines, prostaglandins, leukotrienes, heparin and proteases resulting in oedema, erythema, pain and itching[2]. The swelling and inflammation will usually settle in a matter of hours to days but can sometimes last for several weeks if there is an ongoing reaction to the dermal filler. Initial treatment involves anti-histamines (e.g. loratadine 10mg once a day or cetirizine 10mg once a day) although oral steroids may be required if there is significant swelling and discomfort (e.g. prednisolone 40mg once a day for 1 week).

Oedema > 2 weeks duration

In some circumstances, swelling can be prolonged and last for several months. In these situations, it is prudent to identify the cause of the swelling rather than just to try and treat the swelling in isolation. Superficial product placement is often misdiagnosed as oedema and certainly when a hyaluronic acid is injected too superficially, it will attract a large amount of water giving the impression of swelling. The treatment should be directed to dealing with the incorrectly placed product to improve the oedema (See ACE Group Guideline on The Use of Hyaluronidase in Aesthetic Practice)[4,21]. Eyelid oedema secondary to hyaluronic acid filler treatment is safely and effectively treated with hyaluronidase[21]. Hyaluronidase can be effective up to 7 years after the initial dermal filler treatment[22]. Similarly, if there is an underlying inflammatory nodule this is also likely to cause some local oedema and should be dealt with appropriately (See ACE Group Guideline on Delayed Onset Nodules). Infection is another cause and should be treated.

A delayed onset facial oedema may develop several days to weeks after treatment which may be caused by a Type IV hypersensitivity reaction[2]. These are characterised by T lymphocytes rather than antibodies and present with induration, erythema and oedema. These reactions do not respond to anti-histamines but can be treated with oral steroids. As the hypersensitivity is usually long-lasting, the patient is usually prescribed a loading dose of steroids with a tapering off regime to the lowest dose that will control symptoms (e.g. prednisolone 40mg a day for 1 week then reduce by 5mg every few days until symptoms are controlled at the lowest possible dose, usually around prednisolone 5mg). As there are risks and other considerations associated with longer term steroids (including gastric ulceration and osteoporosis), often the best course of action would be to remove the underlying problem and dissolve hyaluronic acid filler with hyaluronidase and for non-hyaluronic acid fillers, attempt to remove by extrusion, dispersion or breakdown with laser therapy[2]. In these situations, management should be performed by an aesthetic practitioner experienced in these complications.

If there are no other treatment options, a short course of diuretic may be prescribed (e.g. Furosemide 20-40mg a day for 7 days[23]) to see if this resolves the problem. Other therapies that appear safe but have very limited evidence for their use include radiofrequency and ultrasound therapy applied to the swelling.

Follow-up

All patients presenting with significant oedema should be carefully followed-up and photographs should be taken to objectively assess the swelling over time. If the oedema persists for over 6 weeks and intervention has not been successful, it would be sensible to consider referral to a practitioner who has more experience in this area.

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The ACE Group have produced a series of evidence based and peer reviewed guidelines to help practitioners prevent and manage complications that can occur in aesthetic practice. These guidelines are not intended to replace clinical judgement and it is important the practitioner makes the correct diagnosis and works within their scope of competency. Some complications may require prescription medicines to help in their management and if the practitioner is not familiar with the medication, the patient should be appropriately referred. Informing the patient's General Practitioner is considered good medical practice and patient consent should be sought. It may be appropriate to involve the General Practitioner or other Specialist for shared care management when the treating practitioner is not able or lacks experience to manage the complication themselves. Practitioners have a duty of care and are accountable to their professional bodies and must act honestly, ethically and professionally.

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