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Prevention, assessment and techniques: How the patient comorbidities can influence the dermal filler procedure result and eventual complication

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Abstract

The use of dermal fillers in minimally invasive facial aesthetic procedures has become increasingly popular of late, yet as the indications and the number of procedures performed increase, the number of complications is also likely to increase. Careful attention to patient factors and technique can do much to avoid these complications, and a well-informed practitioner can mitigate problems when they do occur. Since cosmetic surgery is usually an elective process, requested by the patient, clinical trials are complex to organize and run. For this reason, an international group of practicing physicians in the field of esthetics came together to share knowledge and to try and produce some informed guidance for their colleagues, considering the literature and also pooling their own extensive clinical experience.

This manuscript aims to provide a summary of the different factors that might influence the results of dermal fillers in aesthetic procedures and how to prevent them.. Guidance is given on both immediate and long-term management of adverse reactions. The majority of complications are related to accepting patients inappropriate for treatment or issues of sterility, placement, volume, and injection technique. Indeed, a well-trained physician can also minimize the impact of such problems when they do occur.

Introduction

In recent years, the popularity of minimally invasive cosmetic procedures has experienced unprecedented growth, including the use of dermal fillers. A wide range of dermal fillers is now available for use in facial esthetics.[1]

All are potentially capable of causing complications,[2,3] but fortunately, serious

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occurrences are rare, although probably underreported. Careful attention to patient selection, education, and injection technique can minimize the incidence of complications, and an understanding of the early signs of complications and their proactive management can decrease their impact. Selecting appropriate patients, or perhaps more importantly, not treating inappropriate patients, is the first and a crucial step in avoiding complications with dermal fillers.

This review considers the factors that should be borne in mind when assessing a patient for suitability for dermal filler treatment. It aims to give the practitioner an overview of contraindications, preventative measures, recognition of events, and appropriate treatment options. There remains, however, no consensus on the best treatment for adverse reactions, and each treatment option with its advantages and disadvantages should be carefully considered and discussed with the patient.[4]

Cosmetic surgery is usually an elective process, requested by the patient. As such, clinical trials are complex to organize and conduct. For this reason, an international group of practicing physicians in the field of cosmetic surgery came together to share knowledge and to try and summarize what is published and produce some informed guidance for their colleagues. This manuscript is the result of preparation, study, and discussion among the group and is based on the literature as well as the group's clinical experience. The authors acknowledge that this guidance is based on the collective experience of the group at the time of writing, but it is not definitive, and there is a paucity of previously published data in many areas.

Methods

Different subjects emerged as core topics of concerns including patient selection, injection technique and post-procedural cares. The authors developed this consensus paper based on those discussions and a review of the current literature. A round table meeting was convened with interested physicians from some of these countries to discuss adverse events associated with dermal filler treatments and the training requirements for injectors.

Patient selection emerged as a core topic of concern, and in the light of the lack of information, the delegates wished to collate their experience in avoiding complications. Subsequently, the authors

developed this consensus paper based on those discussions and a review of the current literature. PubMed and Ovid Medline databases were selected to identify relevant reports.

Because of the nature of esthetic procedures, where patients are not referred, but elect to have treatment by the practitioner of their own choosing, it is challenging to devise meaningful clinical trials. Some authors have conducted prospective trials, but these are the minority of studies and are often not randomized or controlled. Therefore, our knowledge base comprises case reports and summaries of individual practitioner's experience. This underlines the need to gather consensus views from experienced injectors who have treated many patients.

Pre-procedure considerations

How the Skin Ages: Facial Ageing

Facial ageing is a multifactorial, complex, three-dimensional (3D), dynamic and generally not uniform process, with anatomical, biochemical and genetic correlates. The treat ment of inadequately informed patients can be fraught with problems and may cause dissatisfaction.[5]

Caution should be exercised when confronting an individual who exhibits signs of an underlying mental disturbance or dysmorphophobic tendency.

Well-focused pretreatment photographs should be taken, not only for assessment of treatment effects and any adverse effects but also for medicolegal purposes.[5,6]

The patient's medical history and subsequent evaluation must be comprehensive, and patients should be advised to include cosmetic treatments when giving their history. de Bree et al[7] reported on a patient who received polyacryl amide gel and developed a paranasal granuloma. The authors emphasized that the patient did not disclose her cosmetic treatment history, which confounded the diagnosis.

The suitability of different fillers needs to be discussed, and the patient given an indication of the likely value that can be obtained from treatment.[2,6] Soft tissue augmentation is an elective procedure, and not all those seeking treatment may be suitable candidates on medical grounds. It is important to avoid treating patients who have preexisting conditions that clearly mandate against the use of dermal fillers.

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This is a crucial and often neglected area of esthetic practice.

Other patients may be somewhat dubious candidates, where treatment must be at the discretion of the physician whose informed judgment is paramount.

A convenient way of considering patient-related factors is as skin-related or systemic factors. A clear link needs to be made between the two to ensure that the patients are forthcoming about all conditions or treatments, even if they believe them to be completely unrelated.

Firstly, contraindications detailed in the instructions for use of the chosen filler should be closely adhered to. These mainly refer to the product constituents or excipients; patients with multiple or severe allergies and those with a history of anaphylaxis should not be treated.

Similarly, where data are available on a particular product or technique, the physician should take care not to extrapolate the results or assume that they are transferrable. This includes results obtained only in one area of the anatomy.[8]

Prospective patients with abnormally thin skin or skin atrophy, such as seen in corticosteroid-induced atrophy of the skin due to long-term topical or peroral steroid use, or with conditions such as netoderma, vermiculate atrophoderma, or rheumatoid arthritis-associated skin thinning of the dorsum of the hands, are not suitable candidates for superficial or medium-depth placement of certain fillers. Very thin skin on the eyelids and in cheeks that have many fine wrinkles is also a contraindication for certain fillers.[9]

Infections in, or adjacent to, the region to be treated can be exacerbated and cause complications, since the infecting organism may populate the site of filler use. Thus, any patient with an ongoing skin infection in the area intended to be treated or in the close vicinity of it should not be treated.[10] These condi tions include the following: viral infections such as herpes sim plex virus (HSV) and perioral human papilloma virus (HPV); mollusca contagiosa; bacterial infections with streptococci or staphylococci, such as impetigo; yeast infections; and extensive pityrosporum folliculitis. The presence of excessive amounts of Propionibacterium acnes or parasitic mite infections, such as massive demodex folliculorum infestation, also makes the patient an unsuitable candidate for treatment.

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Active inflammatory dermatitis, including atopic der matitis, allergic contact dermatitis, “status cosmeticus”, or seborrheic dermatitis, also cautions against treatment, and physicians must make a judgment based on the severity of the condition and its proximity to the treatment area.

When active HSV is evident, treatment should be deferred, and a prophylactic agent (acyclovir, valaciclovir, or famciclovir) prescribed to prevent reactivation and spread of HSV because of injection trauma. When treating the perioral area and lips, prophylactic prescribing to patients with known history of HSV episodes should be considered to prevent virus reactivation.[2,11]

Patients may attend for treatment of one facial area while harboring an infectious condition in another (eg, active folliculitis with pustules), assuming that the infected area will not affect their treatment. There is little guidance, and to our knowledge, there are no published studies assessing the pos sible sequelae of treating individuals with active infection, regardless of distance from the treated area.

Patients with infections such as sinusitis, periodontal dis ease, ear, nose, or throat infections, or dental abscesses should not be treated until the condition has resolved.[12] Increasingly, clinical evidence is emerging indicating that these infections might subsequently invade implanted filler areas, inducing biofilm reactions. Later, transition from infection to an stablished hypersensitivity, via toll-like receptors, is possible, since these molecules have been shown to be involved in the development of many pathological conditions, including infectious diseases, tissue damage, and autoimmune and neurodegenerative diseases.[13]

Dermal filler treatment can also aggravate more generalized skin conditions or connective tissue disease, or might not be suitable in some of these conditions. Examples include prominent scars, hypertrophic scarring and keloid, bullous diseases, pyoderma, cutaneous collagenoses (chronic discoid lupus erythematosus or lupus erythematosus, active but not end-stage scleroderma), Marfan syndrome, Ehlers–Danlos syndrome, mixed connective tissue disease, conditions that cause Koebner response such as lichen planus (and related conditions), and active psoriasis. Uncontrolled immune deficiencies, such as

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graft versus host disease, chronic urticaria, and Quincke's edema, may also be adversely affected by dermal filler injection, or conversely might affect the behavior of the filler in the tissue.

Dermal fillers are not contraindicated in patients in whom wound healing is normal, even though they may have an underlying systemic disease. No association has been established between use of fillers and autoimmune conditions.

Thus, patients with HIV, rheumatoid arthritis, diabetes, or scleroderma who have normal wound healing may be treated.[9,10] Conditions such as tuberculosis, Wegener's granulomatosis, transplant patients, patients with inflamma tory bowel disease (Crohn's disease or ulcerative colitis), substantial food intolerance, repetitive urinary infections or impaired renal or hepatic function, thyroid dysfunction, and cachectic or catabolic status need careful consideration on a case-by-case basis.

Disorders of hemostasis or coagulation, for example, coagulopathies, protein C deficiency, hemophilia, and hemoglobin disorders such as thalassemia, need a careful assessment, and an accurate clinical picture of their severity and management must be obtained.

Immune depression or suppression is not necessarily a contraindication to any type of filler,[9] although poly-l lactic acid should be avoided.[10] Clinical experience suggests hyaluronic acid fillers to be safe in patients with porphyria (Meissner, personal communication).

A full medical treatment history is essential, and although there are no defined interactions, certain immunosuppressive agents and steroids should flag up the need to understand the patient's medical history more clearly. Even agents that interfere with cytochrome P450 should be considered as signals to proceed with caution.

Patients should be advised to stop anti-inflammatory and antiplatelet agents a week prior to treatment (if medically appropriate) to minimize bruising, and they may benefit from a list of foodstuffs, herbal supplements, and over-the-counter medications to avoid.[14–16]

Although there is weak evidence that antiplatelet therapy may be continued safely in the perioperative period,[17] there are few publications addressing the issue systematically, and esthetic practitioners

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are warned to be mindful of the bleeding risk that applies to individual patients.[18] Patients with cardio vascular stents or taking anticoagulants in the long term need careful consideration, and the risks must be explained.[6]

Although the most commonly used hyaluronic acid-based products have a favorable safety profile, adverse events can and do occur. Mild and self-limiting complications are rela tively common. Edema and bruising are more or less inevi table, and these mild events resolve quickly.[2,6,12] Although bruising tends to occur more extensively with certain injec tion techniques, such as fast injection, aggressive fanning, high-volume filler deposits, or large bolus injections (more than 0.5 mL per bolus), all sensible precautions should be taken with any injection technique.[19,20]

Timing of other cosmetic procedures

Botulinum toxin treatment should be planned 2 weeks prior to filler. Using botulinum toxin first can help in assessment of the need for treatment of residual issues such as static lines and deep folds that can be treated with hyaluronic acid fillers.[21] From a safety perspective, however, the treatments may be given on the same day.

Microdermabrasion, chemical peels, and intense pulsed light (IPL) should ideally be carried out 1–2 weeks pre- or posttreatment and fractional resurfacing 3–4 weeks dis tant to allow erythema to diminish and the skin barrier to reestablish. One small pilot study, however, compared injec tion of hyaluronic acid-based filler immediately followed by laser, radiofrequency (RF), or pulsed light treatments (IPL) to injection of filler alone. The results suggested that laser, RF, and IPL may be safely administered immediately after hyaluronic acid gel implantation. Data suggest that deeper filling immediately before laser therapy, when the concomi tant swelling may facilitate the effect of the laser, may be acceptable.[9]

Using biodegradable or temporary fillers over permanent fillers has always been a heavily debated subject.

Lemperle et al stated that temporary fillers may be injected on top of a permanent filler or can be used preceding the permanent filler with no interference between the two and that fear of a second

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filler inducing granuloma formation remains hypothetical.[9]

The present authors, however, would strongly discourage this practice, as it is generally accepted that the formerly called "permanent" fillers (now referred to as late or minimally biodegradable fillers) are associated with substantially more frequent and late-occurring side effects, sometimes occurring years after implantation.

When one type of filler is used on top of, or around, the other, and a side effect emerges, it is impossible to determine the causal agent without biopsy, specific pathology staining, and examination of the sample. Moreover, the duration, prognosis, and eventual treatment options of the side effects may be completely different for the two types of filler. Caution is also needed – albeit to a lesser extent – when injecting over surgically inserted solid implants (eg, expanded polytetrafluoroethylene or polylactic acid plates and screws).

To avoid possible infection or hypersensitivity, treatment should not be undertaken in the immediate period following other routine medical procedures (including vaccination).[12]

Dental procedures should be performed at least 2 weeks pre- or posttreatment to minimize the risk of hematogenous bacterial spread and potential development of biofilm.

Chlorhexidine mouthwash prior to perioral injections (lips, borderline mucosal, or oral cavity approach of injection) will reduce oral bacterial flora for 8 hours, also minimizing the risk of contamination when lip licking.[22]

Patients should understand the need to take precautions and be scrupulously clean after treatment, such as avoiding touching and keeping hair away from the treated area for

several hours. Patients should not use cosmetics (especially lipstick post-lip enhancement) for 24 hours and use new containers of lotions and new/clean brushes, sponges, etc.[15,23]

The patient should be willing and able to attend a consulta tion 2–4 weeks after any procedure and should report any concerns or signs of problems as soon as possible.

Conclusion

Aesthetic medical procedures with dermal fillers are becoming increasingly popular.

For this reason, aesthetic clinicians must become aware of how to prevent and how to manage any potential complications. The wide range of dermal fillers available for use in facial esthetics makes it essential to have a thorough knowledge of the relevant product characteristics. Clinicians must have a sound understanding of facial anatomy and be suitably trained and experienced to ensure correct product selection, preparation, and injection technique. Appropriate patient selection is vital, and the importance of fully investigating the patient's previous medical injection history prior to treatment should not be underestimated.

The majority of complications are related to sterility, placement, volume, and injection technique. Small, slow, deep injection with massage should be considered at every procedure to introduce the product gently and evenly.

Clinicians should be fully aware of the signs and symptoms related to complications and be prepared with agents readily available in the office to enable them to act swiftly and proactively.

Adverse events and the treatment options are not discrete.

A broad knowledge and in-depth investigations are important for satisfactory management and outcome. Equally, collecting and sharing adverse reactions is important to improve our knowledge and to the development of consistent, effective protocols. Finally, clinicians should always consider seeking advice from a trusted colleague.

Moreover, to prevent future undesirable outcomes and serious adverse events, it will be important to carefully document the procedure, technique and the filler administered. The key elements that will help clinicians who are just starting to use dermal filler procedures, and it could serve as a basis to standardize the process and to establish how to prevent potential complications of this treatment.

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