

A Case of Fat Injection for Treating Subcutaneous Atrophy Caused by Local Administration of Corticosteroid

Kotaro IMAGAWA and Satoshi OHKUMA

Division of Plastic and Reconstructive Surgery, Shizuoka Red Cross Hospital

(Received December 15, 2009; Accepted April 23, 2010)

A 42 year old female received intramuscular injection of 40 mg triamcinolone acetonide on the right upper arm for the treatment of pollen allergy at another clinic. Subcutaneous atrophy appeared at the injection site a few days after. Since there were no signs of improvement, the patient visited our clinic for further examination. The subcutaneous atrophy after local injection of corticosteroids is generally considered to be reversible and it improves within about 1 year after the injection. After one year since local injection, subcutaneous atrophy did not improve and we performed fat injection using autologous fat. As a treatment, we thought that the fat injection method is a superior method since it is less invasive from a cosmetic standpoint.

Key words: Fat injection, Subcutaneous atrophy, Corticosteroid, Triamcinolone acetonide, Localized involu-tional lipoatrophy

INTRODUCTION

As side effects from local injection of corticoste-roids, occurrence of atrophy of the skin and subcuta-neous tissue at the administration site is well known [1, 2]. We had a case that received intramuscular injection of triamcinolone acetonide in the right upper arm for the treatment of pollen allergy and developed atrophy of subcutaneous tissue coinciding with the site of injection. Since the subcutaneous atrophy after local injection of corticosteroids is known to be improved naturally in about one year [3], little has been reported about its treatment. In the present case, we employed fat injection which demonstrated satisfactory results. The results are reported in this study.

CASE REPORTS

42 years old female with no existing medical history or family history to be noted specifically. On March 17, 2008, for the treatment of pollen allergy, Kenacort A (triamcinolone acetonide) 40 mg was administered by intramuscular injection in the right upper arm at a neighborhood physician. Subcutaneous atrophy appeared at the injection side a few days after and the patient visited the same clinic for examination. It was explained to her that the condition would be cured naturally and the courses were observed without further treatment. However, the condition did not improve and the patient decided to visit our clinic with an introduction on January 21, 2009 for the purpose of a precision examination and possible treatment for the same site.

As the finding at the initial visit, thinning of the skin in the area of 4 × 1.5 cm and subcutaneous atrophy were detected in the right upper arm (Fig. 1). We

recommended tissue biopsy to find causes, but the pa-tient refused such tests. In addition, since the injection of corticosteroid was present as an existing condition, no biopsy was performed. The condition was diag-nosed as subcutaneous atrophy after local injection of corticosteroid and the courses were observed without further treatment. However, no changes were observed in the subcutaneous atrophy in the findings at the second visit three months later. Since no improvements were detected in the subcutaneous atrophy after one year since the local injection, we decided to consider surgical treatments. Due to the patient's request for ab-solutely no treatment causing scars, fat injection from her own tissue was performed on April 14, 2009. Fat was injected using autologous fat obtained from the lower abdomen. Liposuction was performed with a 30 cc syringe on subjects under local tumescent anesthe-sia using 0.25% lidocaine with 1:200000 epinephrine added. These fat tissues were rinsed gently with physi-ological saline. The injection site at the upper arm was locally anesthetized with 1% lidocaine at a dose that would not create a bulge. Fat tissues were aliquoted into 1 cc syringes, and a total of 3.5 cc of fat tissues was injected into the defect site (Fig. 2). The subject was instructed not to massage the injection site for a 1 month after the surgery. There were no apparent com-plexions at the injection site at 6 months post-surgery, and the site became almost flat (Fig. 3).

DISCUSSION

Subcutaneous atrophy after local injection of corti-costeroid has been reported since the report by Ayres [1] in 1964. It has been known as the action when corticosteroids are injected locally that there is an in-hibitory action on proliferation of fibroblast in a dose-

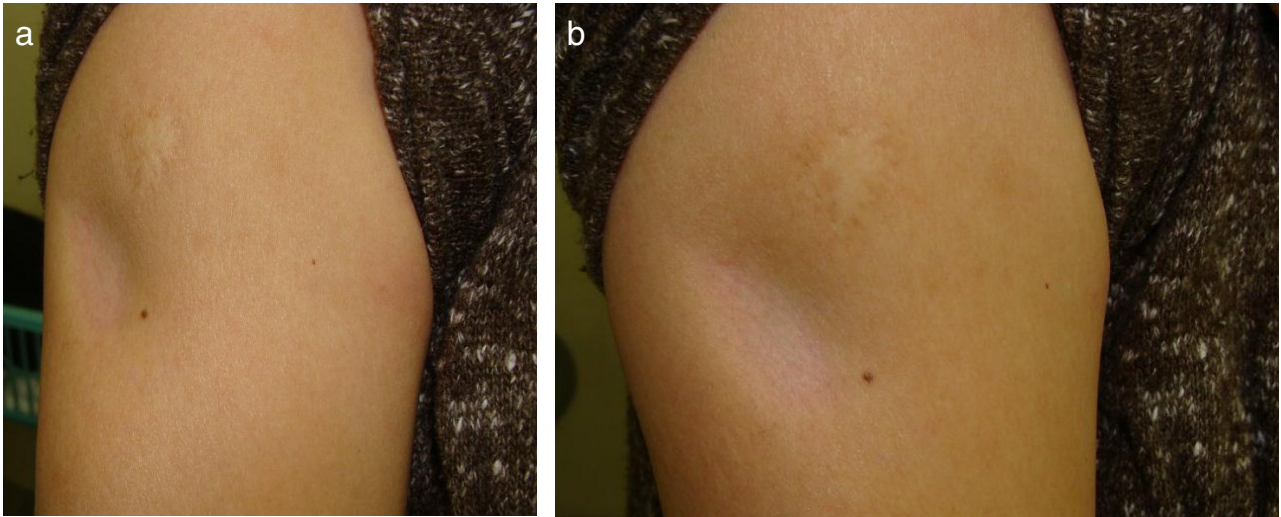


Fig. 1a, b Findings at the initial examination. Thinning of the skin in the area of 4×1.5 cm and subcutaneous atrophy in the right upper arm.

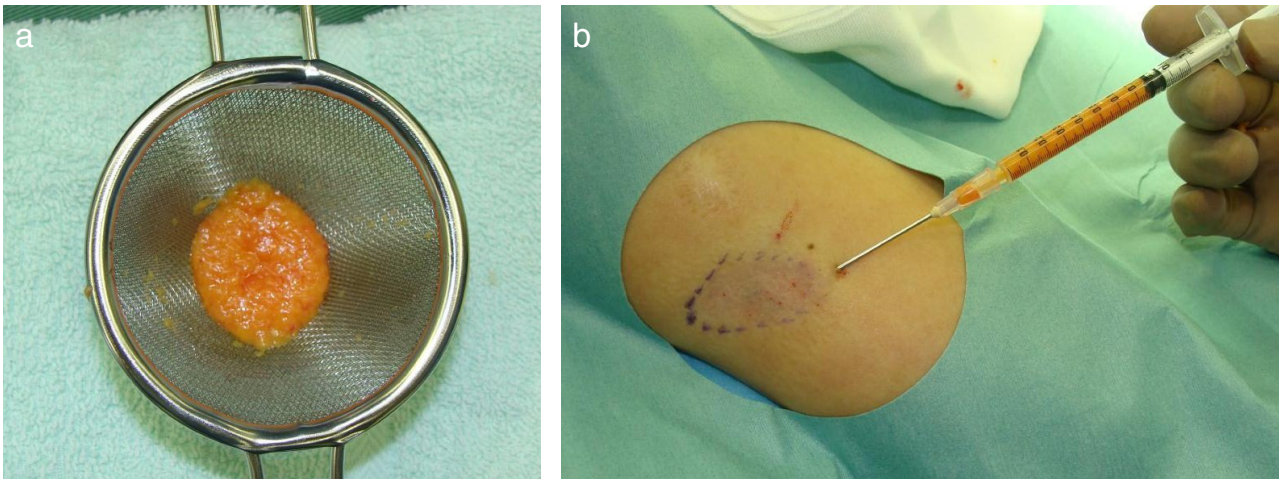


Fig. 2a, b Findings during the operation. Fat was suctioned from the lower abdominal section and rinsed with saline solution to remove hemocytic components. Using a 1 mm syringe and an 18G needle, fat was injected in small portions. Total of 3.5 cc fat was injected into the indented concave part.

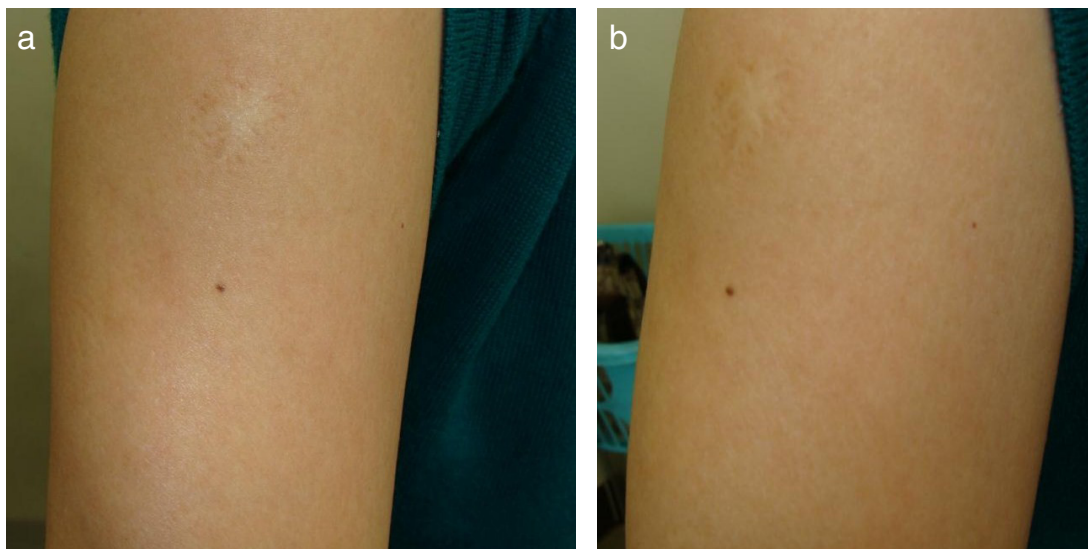


Fig. 3a, b Findings after postoperative 6 months. Satisfactory results were found although a slight indented concave was present.

related manner [4] and that decomposition of collagen is accelerated by the hyperfunctioning of collagenase activation [5]. Clinically, the symptom of disappearance of local subcutaneous fat tissue without inflammatory findings and pathohistologically, the symptom showing micronization of fat tissue are generally called localized involutinal lipoatrophy. According to the report by Dahl *et al.* [6] in 1996, local injection of corticosteroids or antibiotics was found to be present in 62% of the localized involutinal lipoatrophy. We think that this case is same disease.

Recently, many reports [7] of subcutaneous atrophy after intramuscular injection of triamcinolone acetonide as prevention and treatment for allergic conditions such as pollen allergy were found in Japan. The present case presented the similar course. Since the preexisting condition of local injection of corticosteroid was definite, diagnosis was easy. However, we think that it is important to always consider the possibility of local injection of corticosteroids as a cause for localized subcutaneous atrophy.

It is reported in majority of cases that the condition will be reduced or cured naturally within one year, so that it is a reversible change [3]. However, there are some cases reporting no signs of improvement as in the present case and in such a case, a surgical treatment is necessary. As a treatment method, fat graft [8], fat injection [9], temporal fascia implantation [7] were reported. In this study, we performed fat injection. But this technique is not always accepted. Autologous fat injection was first reported [10] by Neuber in 1893, and there are many reports [11-13] of fat grafts surviving well when injected in small amounts at well-vascularized sites. In the 1980s, it became widely used for breast augmentation in the U. S [14, 15]. However, bolus injection of fat frequently caused cyst and calcification associated with necrosis. In 1987, the American Society of Plastic Surgeons issued a guideline that recommended bolus injection of fat should not be used as it might hinder early diagnosis of breast cancer. Since then, there has been a situation that has not easily allowed autologous fat injection [16, 17]. In the 2000s, affirmative study reports [18, 19] on autologous fat injection began to appear, and Coleman [20] reported that fat grafts could survive when appropriate techniques were used. It is believed that the most important point for the survival of fat grafts is to keep them as intact as possible during the injection procedures. The attention points for fat injection are as follows. Fat tissues should be aspirated under mildly negative pressure. It has been reported [21] that approximately 90 percent of cells removed by suction canula (-1atm) were destruction but that approximately 95 percent of syringe aspirated cells (-450 mmHg, -0.6atm) were unchanged. It is recommended that fat should be injected little by little (0.1 ~ 0.5 cc) and it should be spread out evenly. It is reported [22] that cytolysis of fat cells might occur when exposed to the air for a long time. Speedy processing from fat collection to injection is important. Injection in scar tissues is not recommended.

It appeared that autologous fat injection is more appropriate for correcting a small subcutaneous atrophy with no inflammation. In addition, keloid might

develop if an incision is made, so that autologous fat injection is considered to be more appropriate for correction at the upper arm. There was a case [9] in whom fat injection was performed to overcorrect for subcutaneous atrophy in the left lateral thigh after injection of corticosteroid. After surgery, the grafted area had become visibly convex, and fat were aspirated to achieve the desire contour. Therefore, fat should be injected at a minimal amount to raise the skin to the surrounding level. If excavation of the skin is remarkable due to post-operative absorption, fat injection can be repeated in the region. Autologous fat injection has many advantages as an easy and scar-free procedure at suction and injection sites. However, careless procedures might cause complications. Autologous fat injection should be performed in compliance with appropriate operational procedures.

CONCLUSION

Subcutaneous atrophy after local injection of corticosteroids is generally considered to be reversible and it is normally improved within 6 months to a year after the administration. However, there are some cases reporting non-improvements in the atrophy as in the present case. We performed fat injection method using autologous fat source for the subcutaneous atrophy that appeared on the right upper arm and achieved satisfactory results. As treatment of subcutaneous atrophy after local injection of corticosteroids, fat injection is useful method.

REFERENCES

- 1) Ayres S Jr. Alopecia areata with associated subcutaneous atrophy. *Arch Dermatol* 1964; 90: 242.
- 2) Steffey LM. Subcutaneous atrophy following intramuscular administration of triamcinolone acetonide. *Am J Dis Child* 1973; 126: 561-562.
- 3) Friedman SJ, Butler DF, Pittelkow MR. perilesional linear atrophy and hypopigmentation after intralesional corticosteroid therapy. *J Am Acad Dermatol* 1988; 19: 537-541.
- 4) MCCoy B, J. Diegelmann R. and Cohen I K. Invitro inhibition of cell growth, Collagen synthesis, and prolyl hydroxylase activity by triamcinolone acetonide. *Proceed Soc F Exp Biol Med* 1980; 163: 216-222.
- 5) Oikarinen A, Haapasaari K-M, Sutinen M and Tasanen K. The molecular basis of glucocorticoid-induced skin atrophy: topical glucocorticoid apparently decreases both collagen synthesis and the corresponding collagen mRNA level in human skin in vivo. *Br J Dermatol* 1998; 139: 1106-1110.
- 6) Dahl PR, Zalla MJ, Winkelmann RK. Localized involutinal lipoatrophy. *J Am Acad Dermatol* 1996; 35: 523-528.
- 7) Suzuki S, Sirado M. A case of localized involutinal lipoatrophy. *Keisei Geka* 2004; 47: 1117-1122.
- 8) Andre P. Post-cortisone lipo-atrophy treated by an autologous graft of adipose cell islets. *Ann Dermatol venereol* 1990; 117: 733-734.
- 9) Latoni JD, Marshall DM, Wolfe SA. Overgrowth of fat autotransplanted for correction of localized steroid-induced atrophy. *Plast Reconstr Surg* 2000; 106: 1566-1569.
- 10) Neuber F. Fetttransplantation. *Chir Kongr Verhandl Deutsch Gesellsch Chir* 1893; 22: 66.
- 11) Glogau RG. Microlipoinjection. *Arch Dermatol* 1988; 124: 1340-1343.
- 12) Carraway JH, Mellow CG. Syringe aspiration and fat concentration; A simple technique for autologous fat injection. *Ann Plast Surg* 1990; 24: 293-296.
- 13) Ramon Y, Shoshani O, Peled JJ, *et al.* Enhancing the take of injected adipose tissue by a simple method for concentrating fat cells. *Plast Reconstr Surg* 2005; 115: 197-201.

- 14) Bircoll M. Cosmetic breast augmentation utilizing autologous fat and liposuction techniques. *Plast Reconstr Surg* 1987; 79: 267-271.
- 15) Johnson GW. Body contouring by macroinjection of autologous fat. *Am J Cosmet Surg* 1987; 4: 103-109.
- 16) Illouz YG. Present results of fat injection. *Aesth Plast Surg* 1988; 12: 175-181.
- 17) Ersek RA. Transplantation of purified autologous fat; A 3-year follow-up is disappointing. *Plast Reconstr Surg* 1991; 87: 219-227.
- 18) Fulton JE. Breast contouring with "Galled" autologous fat; A 10-year update. *Int J Cosmet Surg Aesthet Derma* 2003; 5: 155-163.
- 19) Spear SL. Fat injection to correct contour deformities in the reconstructed breast. *Plast Reconstr Surg* 2005; 116: 1300-1305.
- 20) Coleman SR. Structural fat grafting; More than a permanent filler. *Plast Reconstr Surg* 2006; 118: 108S-120S.
- 21) Nguyen A. Pasyk KA. Bouvier TN. *et al.* Comparative study of survival of autologous adipose tissue taken and transplanted by different techniques. *Plast Reconstr Surg* 1990; 85: 378-386.
- 22) Aboudib Junior JH. de Castro CC. Grandel J. Hand rejuvenescence by fat filling. *Ann Plast Surg* 1992; 28: 559-564.