

Complications of polyacrylamide gel filler in Asian-Australians: a case series

Amanda Yang Shen MBBS,¹ Frank Lin MBBS FRACS (Plast)²

¹ Box Hill Hospital
Eastern Health
Box Hill, Victoria
AUSTRALIA

² Eastern Plastic Surgery
Box Hill, Victoria
AUSTRALIA

OPEN ACCESS

Correspondence

Name: Amanda Yang Shen

Address: Box Hill Hospital
Eastern Health
8 Arnold Street
Box Hill, Victoria, 3204
AUSTRALIA

Email: amanda.yang.shen@gmail.com

Phone: +61 3 8804 9999

Citation: Shen AY, Lin F. Complications of polyacrylamide gel filler in Asian-Australians: a case series. *Aust J Plast Surg.* 2019;2(1):88–92. <https://doi.org/10.34239/ajops.v2i1.85>

Accepted for publication: 5 July 2018

Copyright © 2019. Authors retain their copyright in the article. This is an open access article distributed under the Creative Commons Attribution Licence which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

Section: Breast

Introduction

Polyacrylamide gel (PAAG), known as Aquamid® (Contura Limited, London, United Kingdom, EC4A 1LB) in Australia, is a hydrophilic, non-toxic substance comprised of approximately 2.5 per cent polyacrylamide and 97.5 per cent water. Introduced in the 1970s as a soft tissue filler, PAAG quickly gained popularity for cosmetic procedures in several countries including China, Russia and Iran.^{1,2} However, due to concerns regarding side effects such as breast cancer and glandular atrophy, it was banned in the late 1990s.^{3,4} Complications arising from PAAG injections have been well-documented in countries where it was commonly utilised, mainly in breast augmentation which made up approximately 80 per cent of its use.⁵ Common presentations include lumps, pain, deformity, displacement and infections occurring in up to 18.3 per cent of recipients in some studies.²

Within Australian literature, there is currently no published data regarding PAAG fillers. Given the increasing population of Chinese immigrants, it is likely that complications will be seen more frequently within our healthcare system in the coming decades.⁶ This case series aims to highlight the presence of PAAG filler complications in Australia using two case studies with a discussion about symptoms, signs and best-practice management.

Keywords: breast, dermal fillers, injectables, foreign-body reaction, infection

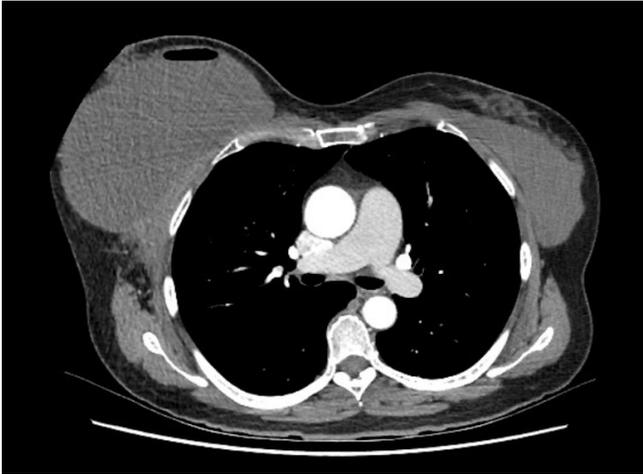


Fig 1. Right breast collection seen on CT

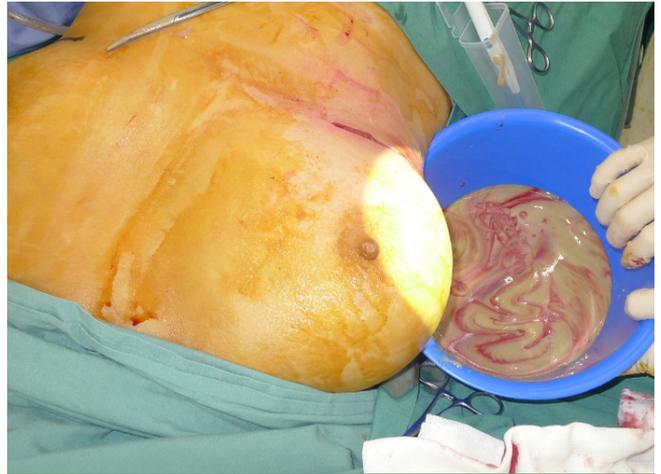


Fig 2. Pus drained from right breast



Fig 3. PAAG filler drained from the left breast



Fig 4. Filler seen at lateral nose

Case 1

A 53-year-old woman presented with two months of right breast swelling and fevers with a background of bilateral free PAAG filler augmentation in China 14 years earlier. MRI showed free prosthetic material in subglandular and subpectoral pockets on both sides without parenchymal lesions (**Figure 1**). On examination she had marked swelling and mild erythema of the right breast with elevated inflammatory markers. The patient was taken to theatre the same day for evacuation of the prosthetic filler. Via bilateral infra-mammary incisions, 900ml of purulent material was evacuated from the right breast (**Figure 2**) and 300ml PAAG filler removed from the left breast (**Figure 3**). Tissue culture, swab culture and capsule histopathology demonstrated scant mix of skin flora. Mycobacterial PCR for tuberculosis was negative. Capsule histopathology from both sides showed fibrous pseudocapsule

with extracellular foreign body material and a mixed inflammatory cell infiltrate. The patient completed a six-week oral antibiotic regime and made an uncomplicated recovery.

Case 2

A 57-year-old woman presented with facial cellulitis with one week of increasing erythema and swelling of the nose, forehead and cheeks with a background of cosmetic nasal dorsum augmentation with PAAG filler in China eight years earlier. Ultrasound and MRI of the face showed two pockets of displaced filler material on the lateral aspect of the nose and left zygomatic arch. She was taken to theatre the following day to drain two abscesses on bilateral nasal side walls and to remove the PAAG filler (**Figure 4**). Swab for microscopy and culture did not isolate a dominant organism. Nasendoscopy showed no sinusitis or nasal discharge and healthy

Table 1: Patient characteristics and details of the sample population

Patient characteristics	Location of PAAG filler	Date of injection	Complication	Treatment
53 yo female	Bilateral breasts	2003	Abscess	Surgical debridement
40 yo female	Bilateral breasts	2012	Swelling, lump, granuloma	Surgical debridement
54 yo female	Nasolabial folds	2000	Deformity	Surgical debridement
57 yo female	Nose and cheeks	2008	Abscess, filler migration	Surgical debridement
31 yo female	Left temple	2009	Abscess, oil cyst	Surgical debridement
31 yo female	Nose	2010	Deformity	Surgical debridement
31 yo female	Bilateral brows	Unknown	Asymptomatic	Awaiting surgical debridement
36 yo female	Chin	2012	Deformity	Juvederm
58 yo female	Bilateral breasts	1998	Deformity, lump	Conservative
32 yo female	Chin	2009	Infection	Conservative
34 yo female	Face	2010	Deformity	Conservative
38 yo female	Face	Unknown	Asymptomatic	None

intranasal mucosa. The patient responded well to antibiotics and dressings and was discharged without issue.

Sample group

At least a dozen more patients have been seen by the senior author within the last two years with various symptoms and complications following PAAG filler injection. Some are awaiting elective surgical removal of the product while others have elected for observation only. Within this sample of patients, all presentations are for filler complications in the face or breast, with the initial procedure having occurred in China (see **Table 1** for details)

Discussion

These cases demonstrate that PAAG filler complications are not uncommon within Australia, despite the fact that it was not widely used in Western countries outside of Europe.⁷ Our sample group focused on patients who had immigrated from China, where use of PAAG augmentation in the last 20 years was significant. Many of these patients had the filler injected over a decade ago. This suggests that the foreign material can lay dormant for many years before causing later complications. We believe this is the first study to focus on PAAG complications within Australia, highlighting the potential morbidity associated

with a cosmetic procedure used extensively overseas that is relatively unknown to many local clinicians.

The aetiology of reactions to gel fillers is unknown, though Christensen suggests that they may be due to infection from commensal skin bacteria.⁸ In a study by Patlazhan, *Staphylococcus epidermidis*, either alone or with other organisms, was found in bacterial culture of the evacuated gel.⁹ De Boule also describes a number of complication types from facial filler injection within European patients including: hypersensitivity, haematomas, pigmentation, necrosis and granuloma formation. These complications can occur by type I or type IV hypersensitivity reactions, or disruption to blood supply of or adjacent to the injected area.¹⁰

Treatment strategies

A number of articles investigating the best treatment for complications of PAAG breast augmentation have been published.¹¹ Magnetic resonance imaging (MRI) is typically the most sensitive and comprehensive diagnostic modality, as it is able to clearly assess anatomical distribution of the foreign material. Ultrasound may also be helpful, while mammogram should be performed if there is suspicion of malignancy.¹¹

Surgical removal of PAAG filler is the treatment standard, usually via a peri-areolar, inframammary

or axillary incision.^{2,11-13} For displaced PAAG on the thoracoabdominal wall, Chen suggests using a sub-areolar incision combined with surgical drainage of the gel mass in the chest wall via an inferior approach, with suture closure of the fistula tract.¹⁴ Outcomes are usually satisfactory and most patients report resolution of symptoms postoperatively, as noted above in our first case study.^{2,9,11-13} Immediate breast reconstruction with silicone prostheses or autologous fat grafting can be offered for patients where there is no infection and the PAAG filler is completely removed. Alternatively, if there is any concern regarding infection or malignancy, delayed reconstruction should only be considered once the underlying issue has been treated, at least three to six months after initial surgery.^{2,11,12}

Complications of facial augmentation can be treated with needle aspiration, incisional drainage or stab incision of the collection of PAAG filler with good effect.¹⁵ Radmanesh also describes a safe and effective technique using a fiberoptic laser by using the laser tip within a metal cannula to liquefy the material.¹⁶ However, in many cases, diffuse distribution of the gel and injection into multiple tissue planes can make treatment difficult or impossible, with unsatisfactory cosmetic outcomes for patients despite surgical intervention.¹⁷

Conclusion

In conclusion, late complications of cosmetic fillers can have significant morbidity and are not uncommon within the Australian healthcare system. Clinicians should be aware of PAAG filler as a potential differential diagnosis in patients who present with breast or facial soft tissue swelling, infection or deformity and have a history of cosmetic surgery, especially in immigrant populations from Asian or Eastern European countries. Treatment is generally surgical evacuation of the prosthetic material, although for smaller pockets such as on the face, needle aspiration or incisional drainage is an appropriate method of removal. Unfortunately, complete removal of the material is extremely difficult and patients should have ongoing follow-up with a plastic surgeon where possible.

Disclosure

The authors report no financial support or relationships that may lead to a conflict of interest.

References

- 1 Chen L, Sha L, Huang S, Li S. Treatment for displacement of PAAG mixture after injection augmentation mammoplasty. *Int J Clin Exp Med*. 2015;8(3):3360–370. PMID:26064226 PMCID:PMC4443060
- 2 Chen B, Song H. Management of breast deformity after removal of injectable polyacrylamide hydrogel: retrospective study of 200 cases for 7 years. *Aesthet Plast Surg*. 2016;40(4):482–91. <https://doi.org/10.1007/s00266-016-0646-5> PMID:27251750
- 3 Margolis N, Bassiri-Tehrani B, Chhor C, Singer C, Hernandez O, Moy L. Polyacrylamide gel breast augmentation: report of two cases and review of the literature. *Clinl Imag*. 2015;39(3):339–343. <https://doi.org/10.1016/j.clinimag.2014.12.008> PMID:25670236
- 4 Zhao Y, Yuan N, Li K, Geng Y, Zhou H, Wang H, Hou J, Zhang B, Cai Y, Zhao X. Bilateral breast cancer following augmentation mammoplasty with polyacrylamide hydrogel injection: a case report. *Oncol Lett*. 2015;9(6):2687–693. <https://doi.org/10.3892/ol.2015.3116> PMID:26137129 PMCID:PMC4473364
- 5 Kalantar-Hormozi A, Mozafari N, Rasti M. Adverse effects after use of polyacrylamide gel as a facial soft tissue filler. *Aesthet Surg J*. 2008;28(2):139–42. <https://doi.org/10.1016/j.asj.2007.12.005> PMID:19083518
- 6 Department of Home Affairs. Migration programme statistics 2018 [Internet]. Canberra: Commonwealth of Australia [cited 24 January 2018]. Available from: <https://archive.homeaffairs.gov.au/about/reports-publications/research-statistics/statistics/live-in-australia/migration-programme>
- 7 Cheng N, Liu L, Hui L, Chen Y, Xu S. breast cancer following augmentation mammoplasty with polyacrylamide hydrogel (PAAG) injection. *Aesthet Plast Surg*. 2009;33(4):563–69. <https://doi.org/10.1007/s00266-008-9298-4> PMID:19156460
- 8 Christensen L, Breiting V, Bjarnsholt T, Eickhardt S, Høgdall E, Janssen, Pallua MN, Zaat, SAJ. Bacterial infection as a likely cause of adverse reactions to polyacrylamide hydrogel fillers in cosmetic surgery. *Clin Infect Diss*. 2013;56(10):1438–444. <https://doi.org/10.1093/cid/cit067> PMID:23392390
- 9 Patlazhan G, Unukovych D, Pshenisnov K. Breast reconstruction and treatment algorithm for patients with complications after polyacrylamide gel injections: a 10-year experience. *Aesthet Plast Surg*. 2013;37(2):312–20. <https://doi.org/10.1007/s00266-012-0045-5> PMID:23381651
- 10 De Boule K. Management of complications after implantation of fillers. *J Cosmet Dermatol*. 2004;3(1):2–15. <https://doi.org/10.1111/j.1473-2130.2004.00058.x> PMID:17163941
- 11 Jin R, Luo X, Wang X, Ma J, Liu F, Yang Q, Wang X. Complications and treatment strategy after breast augmentation by polyacrylamide hydrogel injection: summary of 10-year clinical experience. *Aesthet Plast Surg*. 2018 Apr;42(2):402–09. Epub 2017 Nov 9. <https://doi.org/10.1007/s00266-017-1006-9> PMID:29124374

- 12 Luo S, Chen G, Sun Z, Cheng N. Our strategy in complication management of augmentation mammoplasty with polyacrylamide hydrogel injection in 235 patients. *J Plast Reconstr Aes.* 2011;64(6):731–37. <https://doi.org/10.1016/j.bjps.2010.10.004> PMID:21074506
- 13 Qiao Q, Wang X, Sun J, Zhao R, Liu Z, Wang Y, Sun B, Yan Y, Qi K.. Management for postoperative complications of breast augmentation by injected polyacrylamide hydrogel. *Aesthet Plast Surg.* 2005;29(3):156–61. <https://doi.org/10.1007/s00266-004-0099-0> PMID:15948018
- 14 Chen L, Sha L, Huang S, Li S. Treatment for displacement of PAAG mixture after injection augmentation mammoplasty. *Int J Clin Exp Med.* 2015;8(3):3360–370. PMID:26064226 PMCID:PMC4443060
- 15 Kavoussi H, Ebrahimi A. Delayed Gel indurations as an adverse effect of polyacrylamide filler and its easy treatment. *Dermatol Res Pract.* 2012;2012:1–4. <https://doi.org/10.1155/2012/539153> PMID:23093956 PMCID:PMC3474229
- 16 Radmanesh M, Radmanesh R, Bahadoram M. Successful removal of polyacrylamide hydrogel by pulsed fiberoptic 1444-nm Nd-YAG laser. *J Cosmet Laser Ther.* 2013;15(6):342–44. <https://doi.org/10.3109/14764172.2013.807113> PMID:23692515
- 17 Ono S, Ogawa R, Hyakusoku H. Complications after polyacrylamide hydrogel injection for soft-tissue augmentation. *Plast Reconstr Surg.* 2010;126(4):1349–357. <https://doi.org/10.1097/PRS.0b013e3181ead122> PMID:20885258