Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Am J Otolaryngol 41 (2020) 102664

Contents lists available at ScienceDirect

Am J Otolaryngol

journal homepage: www.elsevier.com/locate/amjoto

Minimally invasive and inexpensive percutaneous abscess drainage using an indwelling needle cannula

Kumiko Tanaka[a], Atsunobu Tsunoda[a,*], Miri Tou[a], Kenji Sonoda[a], Shinpei Arai[a], Takashi Anzai[a], Fumihiko Matsumoto[b]

[a] Department of Otolaryngology, Juntendo University, Nerima Hospital, Japan
[b] Department of Otolaryngology, Juntendo University School of Medicine, Japan

ARTICLE INFO

Keywords:
Cervical abscess
Drainage
Facial abscess
Indwelling needle cannula
Nosocomial infection

ABSTRACT

Purpose: Abscess is still a formidable disease and requires adequate drainage. Moreover, drainage in the head and neck area needs cosmetic care, especially in the pediatric population. In this report, we introduce our method of percutaneous abscess drainage using an indwelling needle cannula.

Patients and methods: Ten pediatric and five adult patients with cervical and/or facial abscess treated with this drainage method were retrospectively reviewed. Using an indwelling needle cannula (18-14 G Surflow®, Terumo, Tokyo, Japan), abscesses were penetrated under ultrasonic examination. Once purulent retention was identified, the inner metal needle was removed and the outer elastic needle was left and fixed. The outer needle was connected to the tube for continuous suction drainage for large abscess.

Results: The primary diseases of these abscesses were cervical abscess of dental origin (5), purulent lymphadenitis (3), pyriform sinus fistula (2) and subperiosteal abscess due to mastoiditis (2), circumorbital cellulitis (1), infection of Warthin's tumor (1), and unknown origin (1). The median (range) duration of drainage was 4 days (3–9 days). Abscesses were successfully treated, and no patients required additional incision for abscess drainage. No apparent scars after drainage were observed.

Conclusion: This technique resembles the usual venous placement of an indwelling needle cannula and is thought to be familiar to physicians. Although simple and inexpensive, this drainage is safe, effective, and minimally invasive for the treatment of abscess.

1. Introduction

In principle, the treatment of abscess in the head and neck area is effective drainage based on bacteriological examination and antibiotic administration [1–4]. However, in the otolaryngological region, the skin is visible, and cosmetic problem inevitably occurs after surgical drainage, especially in pediatric patients. We introduce here our method of percutaneous abscess drainage using an indwelling needle cannula.

2. Patients and methods

After confirming the location of the abscess and puncture route by enhanced computed tomography and/or ultrasonic images, a 18-14 G indwelling needle cannula (Surflow®, Terumo, Tokyo, Japan) with plastic syringe was prepared (Fig. 1). Under ultrasonic examination, the abscess was punctured (Fig. 2). After confirming the presence of abscess, the inner metal needle was removed. The pus was submitted for bacterial examination. Then, the outer elastic needle, which is the indwelling needle cannula, was fixed by adhesive tapes. After the rest of the abscess was suctioned, the indwelling needle cannula was left and covered with gauze. An extension tube was connected when continuous suction drainage was needed (Fig. 2). All cases were hospitalized. The cannula was removed when discharge was no longer obtained.

3. Results

One patient with pyriform sinus fistula required drainage twice due to the blockage of an indwelling needle cannula (Case 1). The median (range) duration of drainage was 4 days (3–9 days). No troubles, such as evulsion by patient, were observed. No patients required additional incision for abscess drainage, and no apparent scars after drainage were observed (Fig. 3). Cases 1 and 15 underwent removal of fistula and tumor after severe inflammation was ceased (Table 1).

* Corresponding author at: Department of Otolaryngology, Juntendo University, Nerima Hospital, Nerima-ku Takanodai 3-1-10, Tokyo 177-0033, Japan.
E-mail address: atsunoda@mac.com (A. Tsunoda).

https://doi.org/10.1016/j.amjoto.2020.102664
Received 15 July 2020
Available online 12 August 2020

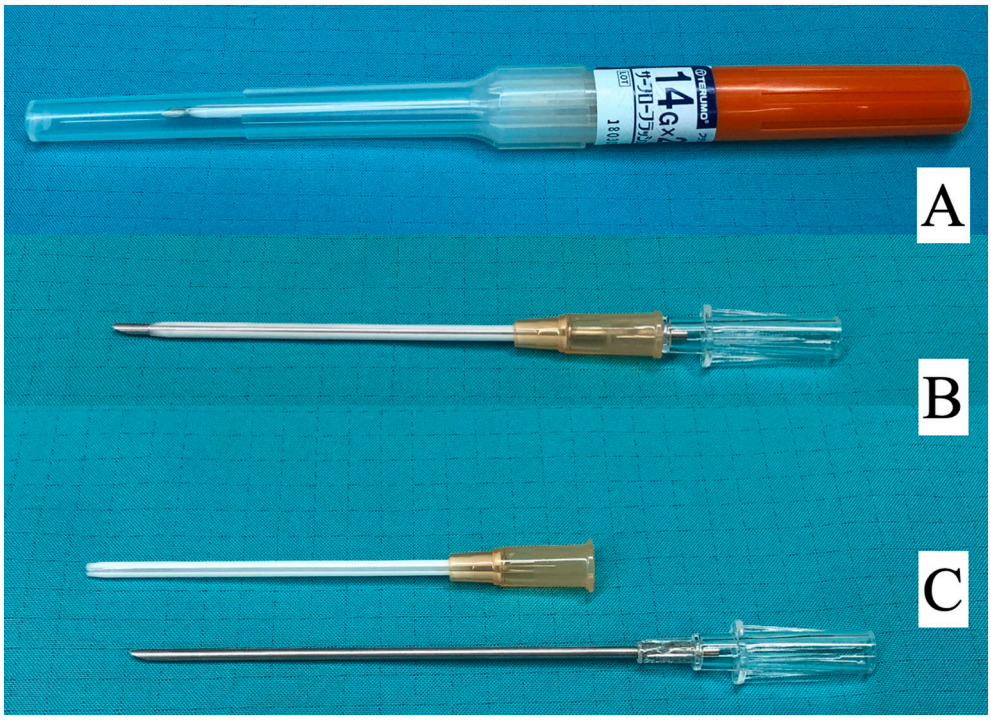

Fig. 1. 14G indwelling needle cannula (Surflow®, Terumo; A). Puncture was done using inner and outer needles (B). When purulent discharge was drained, the outer soft needle was left (C). This maneuver was performed in the same fashion as the placement to the peripheral vein.

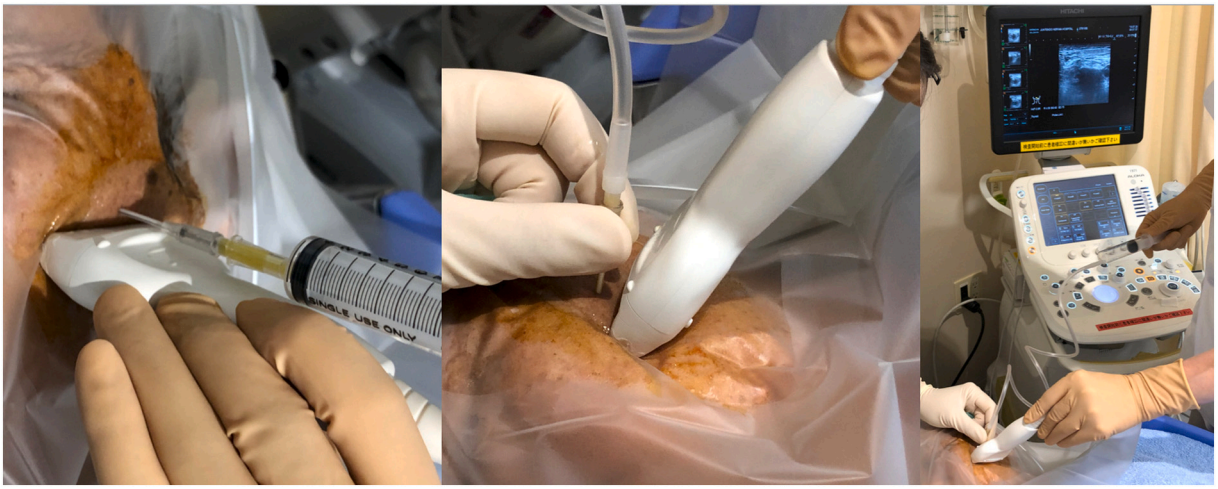

Fig. 2. Procedure of drainage. A 75-year-old man with deep abscess between masseter and pterygoid muscles. Under ultrasonic observation, puncture was done using a 14G indwelling needle cannula (left). Once purulent retention was suctioned, the outer needle was left and attached to the extension tube (middle). The position of the needle tip was also checked by ultrasonication and then fixed (right).

4. Discussion

After the advent of antibiotics, the frequency of encountering abscess decreased. However, otolaryngological organs consist of the upper airway, so abscess formation leads to life-threatening situations [2]. As mentioned, abscess is usually visible in the otolaryngological area, and cosmetic problems inevitably occur after surgical drainage, especially in pediatric patients [5]. A less invasive technique was also reported for submandibular abscesses [6]. However, our method is much easier for clinicians and less invasive for patients. The method is performed in the same fashion as the usual use of peripheral venous placement of an indwelling needle cannula and so is familiar to physicians. Drainage is easy to perform, and it provides both sufficient abscess control and satisfactory cosmetic results without any complications. We recommend at least 18G size of needles but preferably 14G to 16G. Although these needles are relatively thick, the procedure is less invasive compared to skin incision. In addition, this procedure reduces the risk of infection to the medical staff. Like COVID-19 pneumonia, nosocomial infection is a serious problem and less invasive technique is much safer both for patients and clinicians [7,8]. We are convinced that our method reduces damage both to the patients and to the medical staff.

5. Conclusion

The percutaneous abscess drainage using an indwelling needle cannula is not only effective but also easy, minimally invasive, and inexpensive. The technique resembles the usual venous placement of an

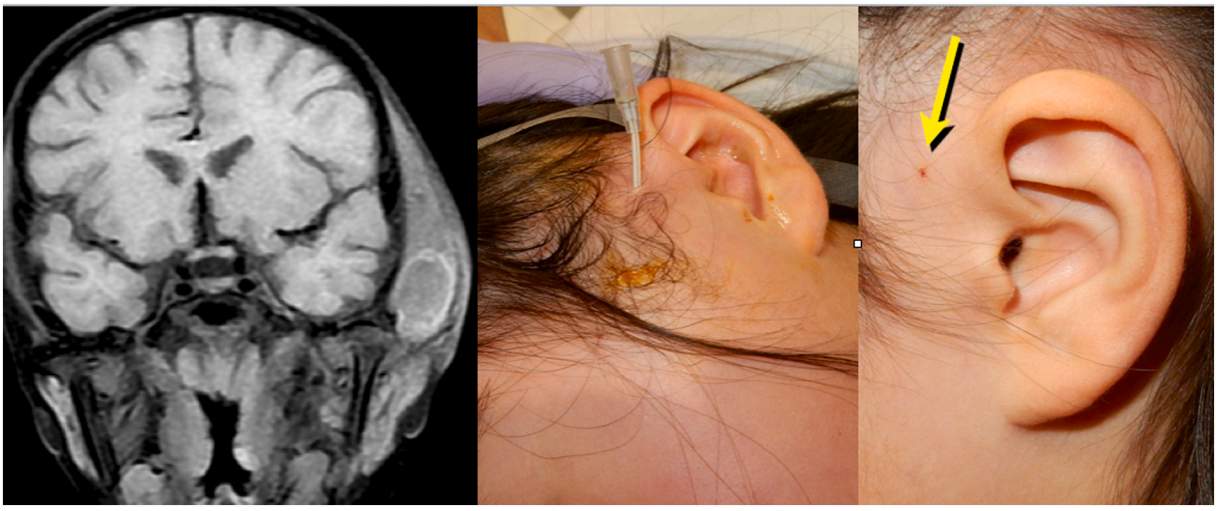

Fig. 3. A 9-year-old girl with abscess in the temporal region. Gadolinium-enhanced magnetic resonance imaging showed abscess and surrounding enhancement in the outer periosteal temporal area (left). An outer needle (16G indwelling needle) was left (middle). A day after the removal of the outer needle, no apparent scar was observed (right).

Table 1
Cases in this report.

Case	Age/sex	Disease	Bacterial examination	Size of needle	Vacuum drainage	Duration of needle insertion (days)	Antibiotics
1	10 y/F	Pyriform sinus fistula	*Eikenella* sp./*Prevotella*	18G	+	7	ABPC/SBT
2	49 y/M	Circumorbital cellulitis	*Prevotella*	16G	−	7	ABPC/SBT, CLDM
3	88 y/M	Cervical abscess	*Fusobacterium*	16G	+	9	CLDM
4	6 mo/F	Subperiosteal abscess due to mastoiditis	*Group A beta-streptococcus*	14G	+	4	ABPC/SBT
5	9 y/F	Subperiosteal abscess due to mastoiditis	*Streptococcus pneumoniae, mucoid strain*	16G	+	4	ABPC/SBT → ABPC
6	7 y/M	Purulent lymphadenitis	*Staphylococcus aureus*	18G	+	7	PIPC
7	5 y/M	Purulent lymphadenitis	*Microaerophilic streptococcus*	14G	+	3	ABPC/SBT
8	7 y/M	Pyriform sinus fistula	*Microaerophilic streptococcus, Prevotella*	14G	+	4	ABPC/SBT
9	5 y/M	Purulent lymphadenitis	*Microaerophilic streptococcus*	14G	+	3	ABPC/SBT
10	7 y/M	Cervical abscess	*Microaerophilic streptococcus, Prevotella*	14G	+	4	ABPC/SBT
11	2 y/F	Cervical abscess	*Staphylococcus aureus*	18G	+	4	ABPC/SBT
12	75 y/M	Cervical abscess	*Microaerophilic streptococcus*	16G	+	4	ABPC/SBT
13	75 y/M	Cervical abscess	*α-Streptococcus*	14G	+	4	PcG
14	7 mo/M	Cervical abscess	*Staphylococcus aureus*	16G	−	4	ABPC/SBT
15	70 y/M	Warthin's tumor	*Negative*	14G	−	6	ABPC/SBT
16	69 y/M	Masticator space abscess	*Peptostreptcoccus* sp.	14G	+	3	ABPC/SBT

indwelling needle cannula and is thought to be familiar to physicians.

CRediT authorship contribution statement

Kumiko Tanaka and Atsunobu Tsunoda: Conceptualization, Methodology, Writing- Original draft preparation, Writing- Reviewing and Editing,

Miri Tou, Kenji Sonoda, Shinpei Arai, Takahi Anzai, Fumihiko Matsumoto.: Investigation.

Fumihiko Matsumoto: Supervision.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amjoto.2020.102664.

References

[1] Gilbert W, Levitt MC. Cervical fascia and deep neck infections. Laryngoscope 1970;80:409–35.
[2] Lazutkin A, Korem M, Weinberger JM, Eliashar R, Hirshoren N. Otolaryngology/head and neck region manifestations of Brucella. Laryngoscope 2018;128:2056–9.
[3] Jiramongkolchai P, Lander DP, Kallogjeri D, et al. Trend of surgery for orbital cellulitis: an analysis of state inpatient databases. Laryngoscope 2020;130:567–74.
[4] Wong DKC, Brown C, Mills N, Spielmann P, Neeff M. To drain or not to drain – management of pediatric deep neck abscesses: a case–control study. Int J Pediatr Otorhinolaryngol 2012;76:1810–3.
[5] Wang Y, Zhang J, Dong L, Jiang H, Song X. Orbital abscess treated by ultrasound-guided fine needle aspiration and catheter drainage. Medicine 2019;98:e17365.
[6] Probst FA, Otto S, Rainer Sachse R, Cornelius CP. Minimally-invasive catheter drainage of submandibular abscesses. Br J Oral Maxillofac Surg 2013;51:e199–200.
[7] Vukkadala N, Qian ZJ, Hosinger FC, Patel ZM, Rosenthal E. COVID-19 and the otolaryngologist: preliminary evidence-based review. Laryngoscope 2020;00. https://doi.org/10.1002/lary.28672.
[8] Zhaoa C, Viana A, Wanga Y, Wei HQ, Yan AH, Capassod R. Otolaryngology during COVID-19: preventive care and precautionary measures. Am J Otolaryngol 2020. https://doi.org/10.1016/j.amjoto.2020.102508. In press.