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Case report

Alternative topical anesthesia for bronchoscopy in a case of severe lidocaine allergy

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A B S T R A C T

Lidocaine allergy presents a unique difficulty for both patients and providers who undergo/perform bronchoscopy. We present a case of a 73 yo male with severe lidocaine allergy who successfully underwent bronchoscopy with chloroprocaine topical anesthesia and discuss alternative topical anesthetic agents that may be used in this special situation.

1. Introduction

Topical anesthesia has been a mainstay to provide relief and blunt the cough reflex during bronchoscopy. In the past, topical agents used have included lidocaine, tetracaine, benzocaine, and cocaine; lidocaine being the most popular [1]. The American College of Chest Physicians have released a statement suggesting that lidocaine is the preferred topical anesthetic agent of choice, given its short half-life and favorable side effect profile [2]. The British Thoracic society also recommends lidocaine as the topical anesthetic of choice unless contraindicated [3]. Additional specifications include using 2% nasal lidocaine gel and 1% lidocaine in a spray-as-you-go fashion for optimal blunting of the cough reflex [3]. However, what medication does the bronchoscopist use if a lidocaine allergy is present? We now present a case of a 73-year-old male with severe lidocaine allergy and a need for bronchoscopy.

2. Case presentation

A 73-year-old male with a history of chronic idiopathic autoimmune disease on chronic steroids presented with dyspnea, productive cough, and fever. The patient was admitted to the hospital two weeks prior with prostatic abscess requiring drainage and outpatient intravenous antibiotics. Three days after discharge, the patient developed fever, cough productive of clear sputum, and worsening dyspnea. He was seen in the outpatient setting and subsequently referred to the emergency department for increased work of breathing and desaturations to < 88%.

Emergency department evaluation revealed a temperature of 38.3C, respiratory rate of 32, saturating 94% on 4L supplemental oxygen, with normal heart rate and blood pressure. Exam was significant for tachypnea with crackles bilaterally, without JVD or lower extremity edema. Lab evaluation was notable for a normal white blood cell count (5.8), procalcitonin of 0.32 (0–0.25), negative *Streptococcus pneumoniae* and *Legionalla* antigens, negative nasopharyngeal viral PCR swab, negative blood cultures. A *Pneumocystis* PCR was positive, but the sample was not from the lower respiratory tract. He was unable to provide sputum voluntarily and sputum could not be induced. Imaging with chest radiography and computerized tomography revealed bilateral multifocal infiltrates (Figs. 1 and 2) The patient was started on broad spectrum antibiotics for hospital acquired pneumonia, but was not empirically treated for *Pneumocystis* due to severe allergy to trimethoprim/sulfamethoxazole. The infectious disease service was consulted and felt the *Pneumocystis* PCR was falsely positive and the patient required bronchoscopy to obtain an adequate specimen.

The patient had a history of a delayed hypersensitivity reaction, manifested as a severe desquamative rash, to lidocaine used in skin biopsies as well as epinephrine and methylene blue injected mucosally during colonoscopy. This reaction recurred both with preservative-free lidocaine and articaine. He had safely received 2% chloroprocaine during prior skin biopsies. With the patient's consent, we obtained 20ml of injectable paraben-free 2% chloroprocaine for use as topical anesthetic during the bronchoscopy. We subsequently used the spray-as-you-go technique via bronchoscopy with moderate conscious sedation, using midazolam and fentanyl, which the patient had tolerated previously. The patient tolerated the procedure well with minimal coughing. Ultimately, all microbiologic data from the bronchoalveolar lavage was negative, including *Pneumocystis* PCR, and the patient was treated empirically for hospital acquired pneumonia.

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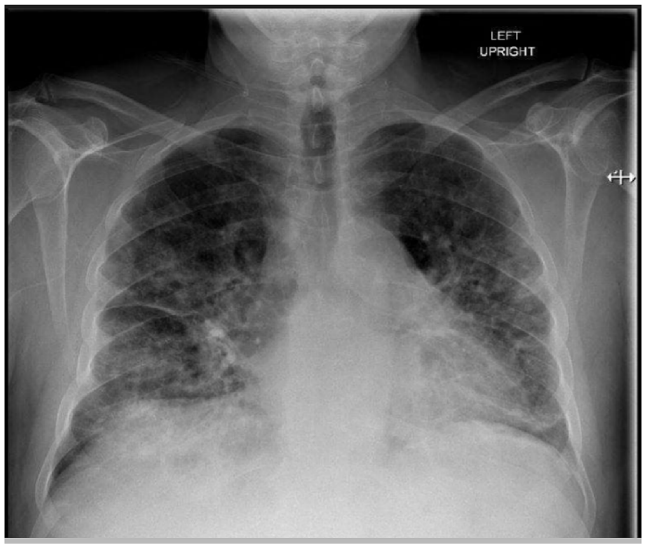

Fig. 1. Chest radiograph demonstrating multifocal pneumonia.

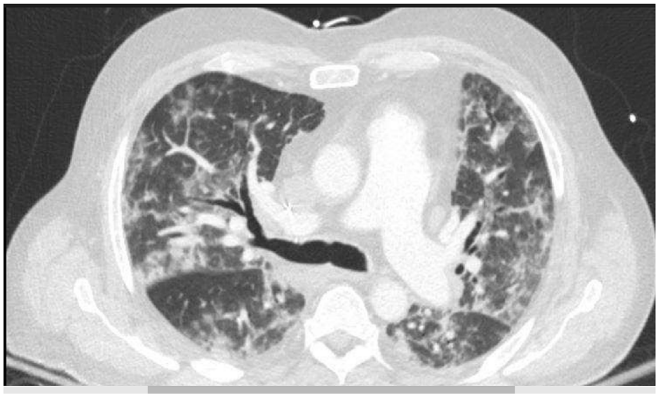

Fig. 2. Representative chest imaging via CT scan.

Table 1
Agents used in topical/local anesthesia based on type, relative potency, duration and maximum dosages [15].

Name	Potency	Type	Maximum Dose	Duration
Lidocaine	2	Amide	4.5 mg/kg	120 min
Prilocaine	2	Amide	8 mg/kg	30 min
Bupivacaine	8	Amide	3 mg/kg	120 min
Articaine	3	Amide	7mg/kg	60 min
Procaine	1	Ester	12 mg/kg	45 min
Chloroprocaine	1	Ester	12 mg/kg	30 min
Tetracaine	8	Ester	3 mg/kg	180 min
Cocaine	2	Ester	3 mg/kg	60 min

3. Discussion

Lidocaine has been the topical anesthetic of choice for bronchoscopy [1–3]. There has been debate over the route of delivery and concentration of lidocaine during bronchoscopy [4–7]. However, when a patient has a lidocaine allergy or allergies to multiple topical anesthetics, the bronchoscopist encounters a unique problem.

Hypersensitivity reactions from lidocaine are thought to be related to paraben within the solution [8]. Lidocaine specifically has been thought to have sensitizing properties relative to other amide anesthetics. Past alternatives have included tetracaine and cocaine [1]. In this case, the patient had experienced hypersensitivity reactions to multiple medications applied topically or infiltrated via mucosal or intradermal injection, but had tolerated chloroprocaine.

Chloroprocaine is a local anesthetic that was developed for use in spinal anesthesia [9,10]. It is an ester, while lidocaine or bupivacaine are amides. For this reason its half-life is much shorter than lidocaine [11]. Its use in spinal anesthesia has demonstrated shorter recovery times and less neurotoxicity compared to lidocaine and bupivacaine [12,13]. Despite a concern of transient neurologic symptoms, there is no conclusive evidence of serious adverse effects from its use [10]. Chloroprocaine has approximately half of the potency of lidocaine when used for local anesthesia (Table 1) [14].

In this case, we were aware that the patient had tolerated chloroprocaine for intradermal anesthesia. Cross reactivity among multiple amide anesthetics has been described using skin testing [16]. While we speculate that an ester anesthetic is less likely than an alternative amide to provoke a type IV hypersensitivity reaction in a patient sensitized to lidocaine, esters are not intrinsically less allergenic than amides [17]. The safety of alternative ester anesthetics will therefore depend on a patient's prior exposure history to both ester and amide anesthetics [18]. We cannot predict *a priori* that all patients with a severe reaction to lidocaine or other amides would tolerate chloroprocaine or another ester anesthetic, though the experience of this case suggests that if a particular ester anesthetic is tolerated for one application, its use may be adapted for bronchoscopy.

We conclude that 2% chloroprocaine, though not previously described in bronchoscopy, was a safe alternative to lidocaine for topical anesthesia in bronchoscopy for a patient with severe hypersensitivity to amide anesthetics. While deep sedation and monitored anesthesia care would also facilitate bronchoscopy in a patient with hypersensitivity to topical anesthetics, those resources are not routinely available during all bronchoscopies at many centers. The use of an alternative agent in this case facilitated safe and expedient completion of the procedure.

Conflicts of interest and source of funding

None.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.rmcr.2017.12.010.

References

[1] L.B. Perry, Topical anesthesia for bronchoscopy, Chest 73 (5 Suppl) (1978 May) 691–693.
[2] M.M. Wahidi, P. Jain, M. Jantz, et al., American College of Chest Physicians consensus statement on the use of topical anesthesia, analgesia, and sedation during flexible bronchoscopy in adult patients, Chest 140 (5) (2011 Nov) 1342–1350.
[3] I.A. Du Rand, J. Blaikley, R. Booton, et al., British Thoracic Society Bronchoscopy Guideline Group, British Thoracic Society guideline for diagnostic flexible bronchoscopy in adults: accredited by NICE, Thorax 68 (Suppl 1) (2013 Aug) i1–i44.
[4] H. Kaur, S. Dhooria, A.N. Aggarwal, et al., A randomized trial of 1% vs 2% lignocaine by the spray-as-you-go technique for topical anesthesia during flexible bronchoscopy, Chest 148 (3) (2015 Sep) 739–745.
[5] W.M. Foster, A.N. Hurewitz, Aerosolized lidocaine reduces dose of topical anesthetic for bronchoscopy, Am. Rev. Respir Dis. 146 (2) (1992 Aug) 520–522.
[6] D. Keane, W.T. McNicholas, Comparison of nebulized and sprayed topical anaesthesia for fibreoptic bronchoscopy, Eur. Respir. J. 5 (9) (1992 Oct) 1123–1125.
[7] S. Charalampidou, E. Harris, K. Chummun, et al., Evaluation of the efficacy of nebulised lignocaine as adjunctive local anaesthesia for fibreoptic bronchoscopy: a randomised, placebo-controlled study, Ir. Med. J. 99 (1) (2006 Jan) 8–10.
[8] M. Saito, M. Abe, T. Furukawa, et al., Study on patients who underwent suspected diagnosis of allergy to amide-type local anesthetic agents by the leukocyte migration test, Allergol. Int. 63 (2) (2014 Jun) 267–277.
[9] G. Veneziano, P. Iliev, J. Tripi, et al., Continuous chloroprocaine infusion for thoracic and caudal epidurals as a postoperative analgesia modality in neonates, infants, and children, Paediatr. Anaesth. 26 (1) (2016 Jan) 84–91.
[10] E. Goldblum, A. Atchabahian, The use of 2-chloroprocaine for spinal anaesthesia, Acta Anaesthesiol. Scand. 57 (5) (2013 May) 545–552.
[11] B.R. Kuhnert, P.M. Kuhnert, E.H. Philipson, et al., The half-life of 2-chloroprocaine,

Anesth. Analg. 65 (3) (1986 Mar) 273–278.
[12] C. Camponovo, H. Wulf, D. Ghisi, Intrathecal 1% 2-chloroprocaine vs. 0.5% bupivacaine in ambulatory surgery: a prospective, observer-blinded, randomised, controlled trial, Acta Anaesthesiol. Scand. 58 (5) (2014 May) 560–566.
[13] A. Teunkens, K. Vermeulen, E. Van Gerven, et al., Comparison of 2-chloroprocaine, bupivacaine, and lidocaine for spinal anesthesia in patients undergoing knee arthroscopy in an outpatient setting: a double-blind randomized controlled trial, Reg. Anesth. Pain Med. 41 (5) (2016 Sep-Oct) 576–583.
[14] E. Yung, J.M. Yarmush, J. Weinberg, et al., Comparison of the potency of lidocaine and chloroprocaine in sciatic nerve block in Sprague-Dawley rats, Pharmacology 83 (6) (2009) 356–359.
[15] Open Anesthesia. Local Anesthetics [Open Anesthesia Website]. Available at: https://www.openanesthesia.org/local_anesthetics_systemic_toxicity. Accessed Oct 1, 2017.
[16] R. Fuzier, M. Lapeyre-Mestre, P.-M. Mertes, J.-F. Nicolas, Y. Benoit, A. Didier, N. Albert, J.-L. Montastruc, French Association of Regional Pharmacovigilance Centers, Immediate- and delayed-type allergic reactions to amide local anesthetics: clinical features and skin testing, Pharmacoepidemiol. Drug Saf. 18 (2009) 595–601.
[17] S.T. Eggleston, L.W. Lush, Understanding allergic reactions to local anesthetics, Ann. Pharmacother. 30 (1996) 851–857.
[18] D. To, I. Kossintseva, G. de Gannes, Lidocaine contact allergy is becoming more prevalent, Dermatol. Surg. 40 (2014) 1367–1372.