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Authors

Trueger, NS
Murray, H
Kobner, S
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Global Emergency Medicine Journal Club: A Social Media Discussion About the Outpatient Management of Patients With Spontaneous Pneumothorax by Using Pigtail Catheters

N. Seth Trueger, MD, MPH*; Heather Murray, MD, MSc; Scott Kobner, BS; Michelle Lin, MD[†]

*Corresponding Author. E-mail: ntrueger@gmail.com, Twitter: [@MDaware](https://twitter.com/MDaware).

Annals of Emergency Medicine collaborated with an educational Web site, Academic Life in Emergency Medicine (ALiEM) to host a public discussion featuring the 2014 *Annals* article on the outpatient management of patients with a spontaneous pneumothorax by using pigtail catheters. The objective was to curate a 14-day (November 10 to 23, 2014) worldwide academic dialogue among clinicians about the article. Four online facilitators hosted the multimodal discussion on the ALiEM Web site, Twitter, and Google Hangout. Comments across the social media platforms were curated for this report, as framed by 4 preselected questions. Engagement was tracked through Web analytic tools. Blog comments, tweets, and video expert commentary involving the featured article are summarized and reported. The dialogue resulted in 1,023 page views from 347 cities in 49 countries on the ALiEM Web site, 279,027 Twitter impressions, and 88 views of the video interview with experts. This Global Emergency Medicine Journal Club created a virtual community of practice from around the world and identified common themes around the management of spontaneous pneumothorax, which included substantial practice variation in regard to inpatient versus outpatient management, location of chest tube, the use of aspiration, and chest radiography after placement. [*Ann Emerg Med.* 2015;■:1-8.]

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INTRODUCTION

As described in previous articles, *Annals of Emergency Medicine* and Academic Life in Emergency Medicine (ALiEM) collaboratively host the Global Emergency Medicine Journal Club to increase awareness of key emergency medicine literature.¹⁻³ In this journal club, we featured the 2014 article by Voisin et al⁴ on the outpatient management of spontaneous pneumothorax by using small-bore pigtail catheters with Heimlich valves.

Numerous therapeutic options exist for the initial management of large primary or secondary spontaneous pneumothorax, and practice variations exist nationally and internationally. These include observation, aspiration, or insertion of a pigtail catheter attached either to an underwater seal or a 1-way (Heimlich) flutter valve. The British Thoracic Society first published guidelines for management in 1993.⁵ The most recent 2010 British Thoracic Society update recommends outpatient observation for small pneumothoraces, defined as less than 2 cm from apex, and outpatient observation after successful aspiration for large primary spontaneous pneumothorax. Patients who do not qualify for observation or who fail either observation or aspiration are recommended to receive chest tubes for

drainage. The British Thoracic Society recommends hospital admission for all patients with chest tubes and for all cases of secondary pneumothorax (even after successful aspiration) by these guidelines.⁶ The American College of Chest Physicians published consensus guidelines for the management of spontaneous pneumothorax in 2001.⁷ These guidelines match those of the British Thoracic Society in every way except that they do not endorse aspiration. These guidelines state that “[r]eliable patients who are unwilling to undergo hospitalization may be discharged home from the emergency department with a small-bore [pigtail] catheter attached to a Heimlich valve if the lung has reexpanded after the removal of pleural air (good consensus).”⁷

In this Global Emergency Medicine Journal Club installment, we discussed a 2014 *Annals* article by Voisin et al,⁴ which concluded that outpatient management of primary spontaneous pneumothoraces with pigtail catheters is safe and feasible as a first-line approach with close serial follow-up appointments. In their 4-year prospective observational study of 132 consecutive patients, they quoted a 78% success rate with significant cost savings.⁴ On November 10, 2014, ALiEM published the Global Emergency Medicine Journal Club blog post, which served as a central resource to bring together conversations from the other social media platforms, including Twitter and the

[†]The #ALIEMRP Twitter participants and Google Hangout Videocast participants are listed in the [Appendix](#).

Google Hangout on Air video. The objective of this article is to summarize and report the multimodal Global Emergency Medicine Journal Club proceedings, as well as Web engagement analytics.

MATERIALS AND METHODS

This *Annals* article was selected by the journal editors as part of the *Annals*' Journal Club series.⁸ Three Global Emergency Medicine Journal Club discussion facilitators (N.S.T., H.M., and M.L.) were selected according to their expertise in critical appraisal and medical education in social media by the senior author. In the week preceding the journal club event, promotional tweets were made from the facilitators' Twitter accounts (@MDaware, @HeatherM211, and @M_Lin), ALiEM blog account (@ALiEMteam), and *Annals* account (@AnnalsofEM), using the hashtag #ALiEMJC. At the time, their respective numbers of Twitter followers were greater than 800 (@HeatherM211) and greater than 5,000 (@MDaware and @M_Lin).

Global Emergency Medicine Journal Club Event

The week-long journal club event was launched on November 10, 2014, with an ALiEM blog post that included a brief introduction and abstract for the featured article, an embedded video placeholder for the upcoming live-streamed videocast with the senior author, and 4 discussion questions. The questions were selected by the facilitators and intentionally less focused on "traditional" methodology and critical appraisal issues (as in previous Global Emergency Medicine Journal Club editions). Instead, the focus was on generalizability, particularly the clinical management and geographic, institutional, and clinician variation, under the hypothesis that a more clinical emphasis with the potential for true knowledge translation to the bedside would attract more engagement. In parallel, discussion questions were posed on Twitter. Participants were encouraged to engage in a scholarly discourse on both these platforms among themselves and with the facilitators.

On November 14, 2014 (day 5), a live Google Hangout on Air videocast was hosted, featuring a discussion between Stéphane Jouneau, MD, PhD (Rennes 1 University, France), the senior author of the featured article,⁴ and the discussion facilitators. Concurrently, live-tweet quotes from the discussion were also posted by Scott Kobner, BS (New York University medical student; @Skobner), using the #ALiEMJC hashtag. The questions for the videocast included the preselected journal club questions, as well as other crowd-sourced questions. The video automatically

streamed onto the ALiEM YouTube channel at <https://www.youtube.com/watch?v=AhYZJF4sJoI>, which could be viewed live or later on the ALiEM blog post or YouTube directly.

After the weeklong Global Emergency Medicine Journal Club discussion, Emergency Medicine Cases, an established podcast organization founded by Anton Helman, MD (University of Toronto), summarized and editorialized the videocast discussion. This Journal Jam podcast episode was hosted by Helman and Teresa Chan, MD (McMaster University).

Discussion Analysis

Transcripts from the ALiEM blog comments section, Twitter, and the Google Hangout on Air videocast were analyzed and curated into a summary report using the 4 featured questions as a framework. Content analysis was conducted by one author (N.S.T.) and member checked by a second (H.M.). A full transcript of the blog comments is archived at <http://www.aliem.com/?p=20102>. All tweets with the #ALiEMJC hashtag are archived by Symplur at <http://aliem.link/1wE68BK>. The Google Hangout video can be accessed on YouTube at <http://youtu.be/AhYZJF4sJoI>.

Social Media Web Analytics

Standard Web analytics resources, including Google Analytics, the ALiEM Social Media Widget, YouTube Analytics, and Symplur, were used to track metrics for viewership, social media, the videocast, and Twitter, respectively. All analytics were recorded during the first 14-day period (November 10 to 23, 2014). Fourteen-day download statistics for the Journal Jam podcast were also recorded for December 1 to 14, 2014, provided by the podcasting host company Blubrry.

RESULTS

Social Media Analytics

The aggregate analytic data for the first 14 days of the journal club event are shown in the [Table](#), with a geographic distribution map illustrating the global blog postviewership ([Figure 1](#)). A total of 1,023 readers from 347 cities in 49 countries viewed the ALiEM post, and #ALiEMJC-tracked Twitter discussions garnered 158 tweets from 56 participants, with a total of 279,027 impressions. The affiliated Journal Jam episode recapping the Global Emergency Medicine Journal Club had 8,684 downloads and 752 page views in the first 14 days of release.

Table. Aggregate analytic data from various social media–based discussions for the first 14 days of the online journal club event (November 10 to 23, 2014).

Social Media Analytic Aggregator	Metric	Metric Definition	Count
Google Analytics: a free online service to track page views and other blog metrics	Page views	Number of times the Web page containing the post was viewed	1,023
	Users	Number of times individuals from different IP addresses viewed the site	893
	Number of cities	Number of unique jurisdictions by city as registered by Google Analytics	347
	Number of countries	Number of unique jurisdictions by country as registered by Google Analytics	49
	Average time on page	Average amount of time spent by a viewer on the page	4 min 45 s
ALiEM social media post widget: a Web-based tool embedded into each blog post that tracks engagement metrics for multiple social media platforms	Number of tweets from page	Number of unique 140-character notifications sent directly from the blog post by Twitter to raise awareness of the post	86
	Number of Facebook likes	Number of times viewers “liked” the post through Facebook	13
	Number of Google+ shares	Number of times viewers shared the post through Google+	3
ALiEM comments section	Number of site comments	Comments made directly on the Web site in the blog comments section	28
	Average word count per blog comment (excluding citations)		126
Symplur Analytics: a free online service to track metrics for Twitter engagement of health-related hashtags; used to track Twitter hashtag #ALiEMJC	Number of tweets	Number of tweets containing the hashtag #ALiEMJC	158
	Number of Twitter participants	Number of unique Twitter participants using the hashtag #ALiEMJC	56
	Twitter impressions	How many impressions or potential views of #ALiEMJC tweets appear in users’ Twitter streams, as calculated by number of tweets per participant and multiplying it by the number of followers that participant has	279,027
YouTube Analytics: a free online service to track YouTube video viewing statistics	Length of video interview	Total duration of recorded Google Hangout videoconference session	27 min 8 s
	Number of views	Number of times the YouTube video was viewed	88
	Average duration of viewing	Average length of time the YouTube video was played in a single viewing	7 min 37 s

Summary of the Online Discussion

Q1. How do you (and/or your center) manage patients with new or recurrent large spontaneous pneumothorax (defined as >2 to 3 cm from lung apex)? Catheter aspiration? Inpatient 8- to 12-French chest tube? Pigtail catheter? Other?

Significant practice variation was identified in the Twitter and blog discussions, and centered around the use of aspiration, the location of the patient after pigtail chest tube and Heimlich valve insertion (inpatient or outpatient), the duration of emergency department (ED)–based observation for patients being discharged, and the use of a postplacement chest radiograph.

Although the updated British Thoracic Society recommendations advocate aspiration as the first-line intervention for large primary spontaneous pneumothoraces,⁶ few discussion participants routinely perform aspiration in this instance. Andy Webster, MBBS (Leeds Teaching Hospitals), a practitioner based in the United Kingdom, endorsed compliance with the British Thoracic Society guidelines, ie, simple aspiration first. This was echoed by Jonathon Hurley, MBBS

(Northumberland), a trainee who endorses aspiration by a small-bore catheter, with the benefit of having the option of leaving the catheter in place if the aspiration fails. Additional Twitter comments about practice variations can be viewed in [Figure 2](#). Jouneau suggested that his hospital had adopted the practice of pigtail catheter insertion with Heimlich valve and immediate discharge rather than aspiration because the former was more time efficient (less than 2 hours) than aspiration and observation with repeated chest radiograph (6 hours).

Rachel Poley, MD (St. Michael’s Hospital), Andrew Petrosniak, MD (St. Michael’s Hospital), and Elisha Targonsky, MD (Credit Valley Hospital), all from Canada, indicated a preference for outpatient management after pigtail chest tube insertion with a Heimlich valve. A protocol from a previous study on this topic, conducted at a Canadian center, was cited as the guideline for this local practice and advocates a minimum of 4 to 6 hours of ED-based observation before discharge home.⁹ This was echoed by John Foote, MD, (Mount Sinai Hospital, Toronto) in the blog: “...most primary spontaneous pneumothorax cases can be safely treated as outpatients using a pleural

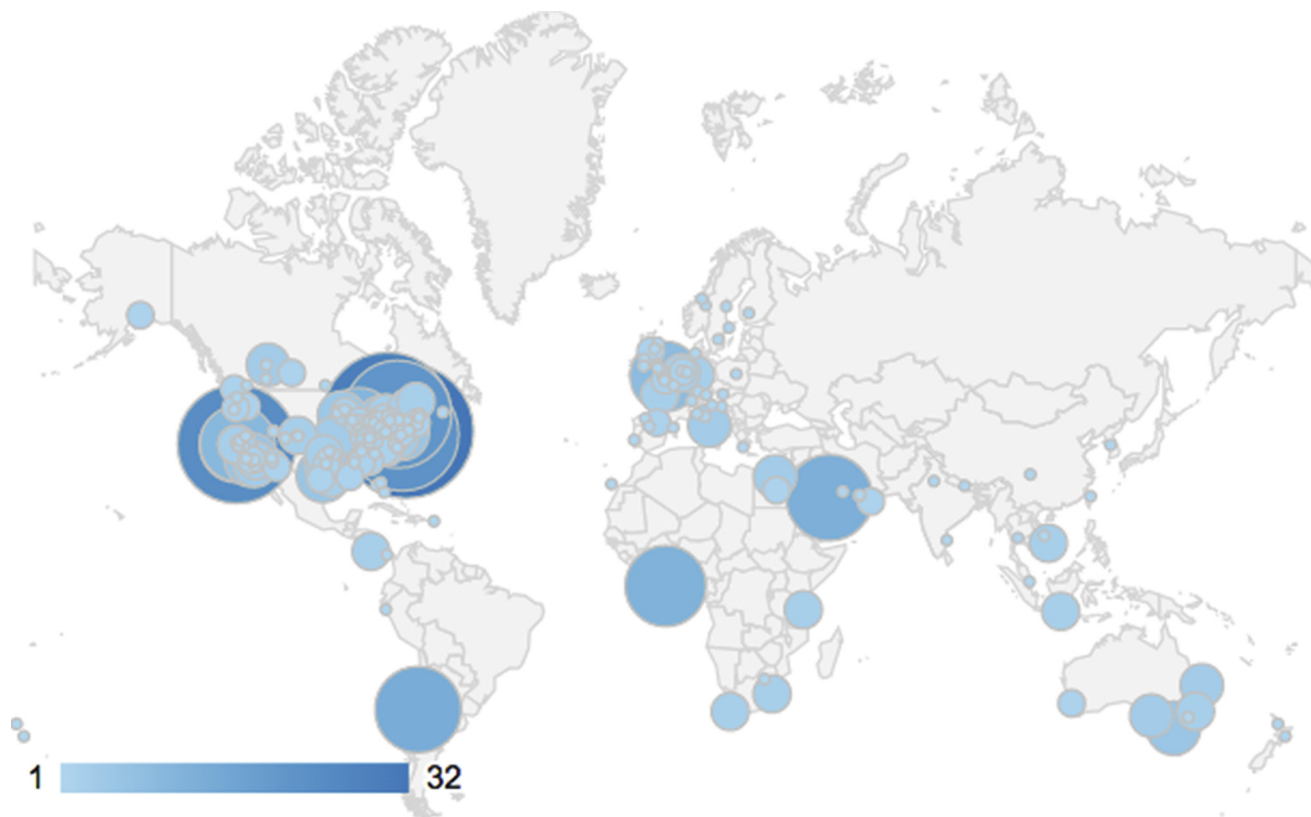


Figure 1. Geographic distribution of readers who viewed the Global Emergency Medicine Journal Club blog post during the first 14 days of discussion.

catheter and portable one way valve (Heimlich valve). I have been treating most patients as an outpatient in this fashion for the past 17 years.”

There was considerable discussion around the need for a postprocedure chest radiograph to confirm chest tube position, with some participants expressing discomfort without imaging confirmation, and an expectation that omitting the radiograph would be an “uphill battle” in North America. The study by Voisin et al⁴ is noteworthy in that clinical confirmation of a functioning Heimlich valve alone after placement of the pigtail catheter was thought to be indicative of successful placement, with no additional information to be gained by chest radiograph–confirmed placement. However, Jouneau said in the video interview that up to half of patients in his institution receive a postprocedure chest radiograph at the providers’ discretion.

Q2. If you were designing the randomized controlled trial of ambulatory pigtail catheter insertion for spontaneous pneumothorax, what would your comparator be? What outcome measures would you like to see? What measure of difference in this outcome(s) would convince you to change your practice?

In the blog, Anand Swaminathan, MD, MPH, (New York University) commented that “20-25% of patients are

going to fail outpatient therapy and need to be admitted. This shouldn’t even be seen as a failure of the protocol but rather a success in ensuring proper follow-up and monitoring.” The ambulatory success rate of 78% documented in the article by Voisin et al⁴ is comparable to the success rate for the use of Heimlich valve alone for the treatment of pneumothorax in a 2013 systematic review of 1,235 patients (77.9%; 95% confidence interval 75.2% to 80.4%).¹⁰

There was a range of opinion about the optimal intervention comparison. Randomized controlled trial designs suggested in blog comments included the following:

- Daniel Cabrera, MD (Mayo Clinic): 3-arm trial comparing inpatient chest tube, inpatient pigtail catheter, and outpatient pigtail catheter
- Zack Repanshek, MD (Temple University): 3-arm trial comparing chest tube, pigtail, and aspiration
- Brendon Stiles, MD (cardiothoracic surgeon, Cornell University): 2-arm trial comparing inpatient and outpatient pigtail catheters

In discussions both on the videocast and blog, participants emphasized the need for patient-related outcomes in addition to successful reexpansion, such as pain, comfort with the catheter, and convenience, consistent with

**Michelle Lin**
@M_Lin

Hey #ALiEMJC interntl ambassadors- how do YOU manage spont PTX at your hosp? @PrecordialThump @umanamd @sofbasauri aliem.com/aliem-annals-e...

**Manrique Umana**
@umanamd

Following

.@M_Lin have to admit there is no consensus. Most get a chest tube or pigtail cath & almost all are admitted (usually 48-72h in ED) #ALiEMJC

**Andywebster**
@Andywebster

Follow

@umanamd @M_Lin non-traumatic primary, aspirate if successful discharge

**Manrique Umana**
@umanamd

Following

.@Andywebster we almost never aspirate them. Probably something we should do more @M_Lin

**Andywebster**
@Andywebster

Follow

@umanamd @M_Lin British society of thoracic guidelines. Better an cheaper for patient. There is a Rocket aspiration kit. Very easy to use

**Natalie May**
@_NMay

Follow

@Andywebster @umanamd @M_Lin Here's a summary of the guideline, Manrique evernote.com/shard/s238/sh/... #FOAMed

Figure 2. Representative Twitter conversation about the management of spontaneous pneumothoraces, with responses by Manrique Umana, MD (Costa Rica), Andy Webster (United Kingdom), and Natalie May (United Kingdom). The last tweet included May's public Evernote link to her notes about the British Thoracic Society practice guidelines. PTX, *Pneumothorax*.

recommendations from previous studies.^{9,10} Stiles also noted a study currently under review advocating an aggressive strategy for early (ie, next-day) primary pleurodesis, given the high pneumothorax recurrence rate of up to 50% during 4 years, referencing Sadikot et al¹¹ at the request of another blog participant.

Q3. All the pigtail catheters were placed by respirologists in this study (there were 5 physicians who performed all the insertions). Are there complications that might be more likely to occur in the hands of less experienced operators?

Although all pigtail catheters were placed by respirologists (pulmonologists) in the featured study, Jouneau revealed that this protocol has now spread to other regional French hospitals without the same level of specialist support. Emergency physicians now place the majority of the tubes in his institution and in these other regional institutions, with broad consensus that this procedure is well within their skill set. Global Emergency Medicine Journal Club discussants thought that this was a reasonable evolution of the protocol and anticipated that there would not be higher complication rates.

In general, there was agreement that the insertion site used in the study (midclavicular line, second intercostal interspace) may not be the preferred location. The use of the anterior axillary line, fifth intercostal interspace was thought by many blog and Twitter participants to be a superior location for patient comfort, with a lower likelihood of occlusion from kinking. Furthermore, because atraumatic primary spontaneous pneumothoraces are relatively uncommon at many institutions, providers may be more proficient and effective in placing the Seldinger-guided pigtail catheters when they already have experience placing chest tubes for other conditions. Julian Guitron, MD, (thoracic surgeon, University of Cincinnati) commented on the blog that "inexperience most likely leads to a more painful insertion and rarely (although it happens) to lung lacerations that we find out at the time of the video-assisted thoracoscopy surgery (VATS) procedure or intercostal bundle injury with significant bleeding." Marlena Tang (Kaiser Permanente San Francisco) noted that in her ED, the second intercostal interspace is the preferred location because of a perceived risk of dislodgement caused by arms rubbing against the catheter in active ambulatory outpatients.

The complication rate in the study was low, with the only reported complication being that 2 of 132 patients experienced kinked catheters; both had this identified and corrected on day 2. There were no reported catheter dislodgements or infections.

Q4. Assuming that the ambulatory pigtail catheters are shown to be equivalent or superior to traditional care in a future randomized controlled trial, do you think this protocol would be feasible in your setting? Are there barriers to implementation at your hospital?

Several US commentators noted that arranging the follow-up for patients discharged from the ED with indwelling chest tubes would represent a barrier to the

adoption of this protocol. Repanshek asked, “What’s wrong with having the patient return to the ED in 48 hours for recheck/catheter removal?,” and similarly, some Canadian commentators indicated that ED-based follow-up is not only feasible but also the default in their institutions. Concerns were raised about access to care for inner-city patients. Some commentators expressed reluctance to direct these patients to return to the ED for follow-up care.

Follow-up appointments, however, are not simple visits; Guitron argued against having these patients be treated subsequently in the ED. “It’s not simply being ‘ok’ with seeing the patient back and removing the tube and stitch, it’s assuming all responsibilities that come attached with caring for patients.” No commentators reported having an institutional protocol for arranging outpatient follow-up with pulmonologists, as in the study algorithm. Stiles agreed that there would be “logistical barriers” to establishing a program for close outpatient monitoring by other pulmonologists or cardiothoracic surgeons. Foote suggested that this subset of patients may be more likely to adhere to an outpatient plan than others discharged from the ED: “Patients who have plastic catheters sticking out of their chests are motivated to return for follow-up since they obviously want the tube out ASAP.”

It was clarified during the videocast that a substantial amount of institutional support existed to ensure patient safety in the French institutions. Every patient underwent a checklist review of the function of his or her tube, structured regular checks for kinks or fluid accumulation, and scheduling for a follow-up appointment. In addition, patients received standardized information materials, which were shared by Jouneau and uploaded to the ALiEM blog post.

LIMITATIONS

Reports from previous Global Emergency Medicine Journal Club and Residents’ Perspective discussions have addressed many limitations of this series.^{1-3,12} This includes sampling bias because participants are more likely to be familiar with newer technology, interested in the topic, and willing to share opinions openly in a public forum. The Twitter analytics platform Symplur has limitations. Many Twitter comments, particularly replies to other tweets, are likely to be missed if they did not include the #ALiEMJC hashtag, thus underestimating the Twitter reach. In contrast, the Twitter analytic data may overestimate participant engagement because of the inclusion of facilitator tweets. For future endeavors, a

manual search through Twitter, although labor intensive, may reveal more relevant tweets.¹³

DISCUSSION

In this edition of the ALiEM–*Annals* Global Emergency Medicine Journal Club series, we report commentators’ perspectives from multiple digital platforms, curated from the blog, Twitter, and Google Hangout video, using the Global Emergency Medicine Journal Club 4-question framework about the trial by Voisin et al⁴ on outpatient pigtail catheter management of primary pneumothoraces. This discussion was more clinically focused than previous Global Emergency Medicine Journal Club episodes in a deliberate attempt to use the global social media platform to discuss and compare international practice variation and system differences. Common themes that arose in the discussions included clinical management (tube size selection, anatomic location, aspiration, confirmatory chest radiograph, disposition, and management algorithms); barriers to implementation (follow-up, multispecialty management, and communication); evidence, ie, citing other research (outcomes, complication and failure rates, and review articles); ideal study design (management techniques, disposition, and outcomes to measure); and marketing (raising awareness of Global Emergency Medicine Journal Club, soliciting comments about specific topics, targeting potential commentators, and live-tweeting the discussion). A critical appraisal discussion of the featured article can be found in the *Annals’* Journal Club series.¹⁴

This asynchronous discussion curated across a variety of online platforms once again illustrates the potential for diverse stakeholders from a variety of backgrounds and locations to engage in a rigorous discussion of the specific study in question, as well as the clinical issue at large. We hope to continue to demonstrate the power of free, online tools to serve as a platform for legitimate academic and clinical discussion, ideally quickening the pace of knowledge translation and improving patient care.

Reflections on the Social Media Analytics and Process

Twitter metrics continue to have consistently high traffic for the Global Emergency Medicine Journal Club series. One tracked metric is Twitter “impressions,” which can be considered an upper limit of “potential viewership” and is calculated as the number of tweets per participant multiplied by that participant’s number of Twitter followers. For example, if an emergency physician with 100 followers posted a tweet that included the #ALiEMJC hashtag, it would generate 100 impressions. Impression

counts (279,027 for this Global Emergency Medicine Journal Club), however, do not guarantee that all followers viewed or engaged with the content. Thus, impressions provide insights more about maximum potential reach, whereas the minimum range is better illustrated by the number of actual tweets (158) with the #ALiEMJC hashtag. Both of these metrics are worth continued monitoring because there is as yet no criterion standard for quantifying Twitter impact and value.

Although Twitter and Web site traffic remains promising, the videocast had lower viewership numbers (88), as well as incomplete viewings. This calls into question the value of these Google Hangout videos. As discussed in previous editions of the Global Emergency Medicine Journal Club,¹⁵ the lack of popularity of the YouTube video may be because watching a video is a more passive form of learning and requires more bandwidth, and the video is fairly long compared with shorter bursts of content users may be accustomed to at ALiEM. A solution might be to instead convert to an audio-only format podcast such as the Journal Jam, given its greater popularity (8,684 downloads), particularly given the time and work required for each Global Emergency Medicine Journal Club edition. This increase in popularity may partially reflect the Emergency Medicine Cases podcast's extant audience, as well as the portability and simplified workflow benefits of a podcast. The benefit of recording and broadcasting live remains the potential for synchronous audience engagement, which has been limited.

CONCLUSION

In this edition of the ALiEM–*Annals* Global Emergency Medicine Journal Club program, curated perspectives are reported from the online discussion featuring the observational study by Voisin et al⁴ of pigtail catheters for primary spontaneous pneumothoraces. Our discussion aimed to promote scholarly dialogue among clinicians and included comments from emergency physicians and cardiothoracic surgeons. Although total participation on the different social media platforms represented only a fraction of practicing emergency medicine providers, this online journal club provided an open forum for practitioners worldwide to share, discuss, and debate their perspectives and local practices. Most participants support the study findings that primary spontaneous pneumothoraces can feasibly be treated with placement of a pigtail catheter and outpatient management, with appropriate systems infrastructure for patient follow-up. Specific comparisons of this approach with alternate strategies should be studied further, with an emphasis on patient-oriented outcomes.

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Supervising editor: Michael L. Callahan, MD

Author affiliations: From the Section of Emergency Medicine, University of Chicago, Chicago, IL (Trueger); the Queen's University School of Medicine and the Department of Emergency Medicine and Department of Public Health Sciences, Queen's University, Kingston, Ontario, Canada (Murray); the New York University School of Medicine, New York, NY (Kobner); and the Department of Emergency Medicine, University of California, San Francisco, and the MedEdLIFE Research Collaborative, San Francisco, CA (Lin).

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APPENDIX

The #ALiEMRP Twitter participants (number of their followers):

@AcademicEmerMed (530), @Ahmedlizq (106), @Albusafi (24), @ALiEMteam (1,545), @Alonso_miguel (0), @AlSomali (500), @Alsugairmd (35), @amabdali (41), @AnnalsofEM (5,462), @APGvD (245), @Apoorvamagic (932), @Apousson (522), @AriBFriedman (699), @ARJalali (5,252), @BaystateEM (515), @BestHospitals (131), @BJERPrincess69 (23), @BoothMemEm (36), @Brent_Thoma (2,755), @CabreraERDR (1,298), @Catheterout (1,105), @CCEMRP (384), @Chaunyjm (158), @CHsu1012 (182), @ChuecasJoaquin (65), @Coujea (17), @CraigCCRNEN (1,246), @DebHourycdc (984), @Docamyewalsh (445), @Doctor_V (22,700), @Drkimnz (5), @Drmithil1 (50), @Drspecialk (300), @EBMgoneWILD (892), @EM_SteveMcGuire (502), @EMAJournal (1,892),

@EMarrest (29), @EMCases (1,610), @EMedCurious (1,220), @EmergOmBur (48), @EmLasvegas (147), @Emlitofnote (4,839), @EMSwami (4,718), @ERmentor (1,000), @Fayazg99 (735), @FOAMpodcast (1,608), @GameYadav (624), @Getdec44 (18), @GrandviewEM (365), @HeatherM211 (879), @Hemodynamik (57), @Hswapnil (778), @IowaEM_Educate (4), @IPCShelli (111), @JamesONeillMD (31), @Jbrunswick08 (84), @Jdfried (156), @JeffEMRes (191), @JenevraME (578), @Jlsamash (19), @JournalofGME (251), @K_ScottMD (402), @KarenLommel (82), @Kavitababu (242), @KestlerMD (835), @LaurieMcGillEM (179), @Lsaldanamd (6,510), @LWestafer (2,700), @M_Lin (9,282), @Maggiemahar (2,785), @Maitiu78 (747), @MallorcaERdoc (58), @Matthew608b (129), @MayoClinicEM (1,327), @MDaware (6,291), @MedEmIt (733), @Megsahokie (27), @MJNeavyn (18), @Njoshi8 (1,889), @Ntdsimon (12), @Nvdwaa (106), @Patricklac (48), @PeterRchai (316), @Pooya_mehr (27), @Preexcitation13 (28), @Prof_idzwan (64), @Purdy_eve (1,293), @Rachelpoley10 (312), @Reneam1 (76), @Rjjaramillo (494), @RobyTerribile (55), @Rocketgirlmd (796), @SAEMonline (3,621), @SchuFlea (131), @SEHdoc_Leoniek (184), @Seth_kelly (311), @SetzerWVU (40), @ShannonOMac (1,048), @ShiraStarfish (9), @Signaturedoc (83), @Skobner (229), @SLuckettG (449), @Sochimu (108), @SynthShaikh (85), @TChanMD (2,537), @The_samer (67), @TheSchwarziee (60), @theTampaDoctor (272), @TomVargheseJr (4,964), @ToxTalk (1,632), @TreatmentScores (1,984), @UCMorningReport (1,237), @UltrasoundREL (654), @Umanamd (2,245), @UMassTox (458), @UPennEM (1,244), @Vikgulati (51), @Wattgrant (117), @Whole_patients (2,175), @WVUEmergencyMed (346), and @ZackRepEM (219).

The Google Hangout Videocast participants: Stéphane Jouneau, Michelle Lin, Heather Murray, and Seth Trueger.