How Twitter conversations using hashtags #regionalanesthesia and #regionalanaesthesia have changed in the COVID-19 era

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INTRODUCTION

Within the regional anesthesiology and acute pain medicine (RAAPM) Twitter community, the two common hashtags are #regionalanesthesia and #regionalanaesthesia.[1] Hashtags (words/phrases following a "#" symbol) identify themed tweets.

Before COVID-19, a common RAAPM topic was opioids, and many fear the opioid epidemic will worsen post-pandemic.[2] We tested the hypothesis that the proportion of #regionalanesthesia and #regionalanaesthesia tweets related to opioids has decreased since COVID-19.

METHODS

This project was deemed exempt by the institutional review board.

Study sample

English language tweets including #regionalanesthesia or #regionalanaesthesia were prospectively collected using TAGS V.6.1.9.1.[3] The first tweet in either hashtag archive to reference COVID-19 was on March 18, 2020. We therefore set our convenience sample from February 1 through April 30, 2020, to compare tweets 6 weeks before (pre) and after (post) this seminal tweet. We included original tweets, replies, and retweets. We excluded duplicates and tweets lacking either hashtag.

Primary outcome

The primary outcome was the proportion of tweets during each time interval referencing opioids. Microsoft Excel (Redmond, Washington, USA) was used to search for opioid terminology and opioid names.

Secondary outcomes

Microsoft Excel was used to search broadly for terms related to COVID-19. Users were categorized manually by ERM and KMJ using Symplur Healthcare Stakeholder Definitions.[4] Tweets were assigned to one of four published categories: scientific, logistical, social, or other.[5] Inter-rater reliability for tweet categorization was determined using Cohen's kappa statistic. The top 10 influencers were determined by tweets and impressions.[5]

Statistical analysis

Statistical analysis was performed using NCSS Statistical Software (NCSS, LLC, Kaysville, Utah, USA) and IBM SPSS Statistics V.23 (IBM Corp., Armonk, New York, USA). The χ^2 test with Yates correction was used for all comparisons of categorical data. For the primary outcome, a two-sided $p<0.05$ was considered statistically significant. All other analyzes were considered exploratory and not adjusted for multiple comparisons.

RESULTS

From 1603 individual tweets with #regionalanesthesia or #regionalanaesthesia, 1268 tweets comprised the final sample after de-duplication: 780 pre (210 original, 561 retweets, and 9 replies) and 488 post (184 original, 287 retweets, and 17 replies). Retweets decreased from 71.9% pre to 58.8% post ($p<0.001$); original tweets increased from 26.9% pre to 37.7% in the post interval ($p<0.001$).

Primary outcome

Opioid tweets decreased from 2.7% (21/780) pre to 0.4% (2/488) post ($p=0.006$).

Secondary outcomes

COVID-19 tweets increased from 0% pre to 26.6% (130/488) post ($p<0.001$). Doctors had the largest tweet decrease (−242 tweets), from 59.7% (466/780) pre to 45.9% (224/488) post ($p<0.001$).

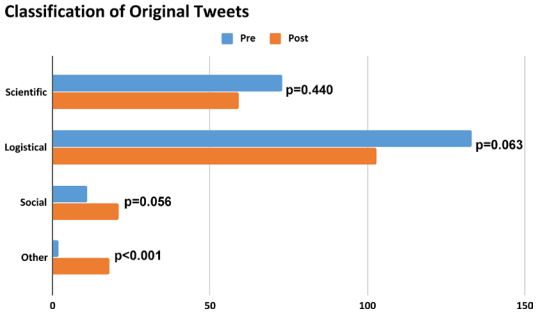

Figure 1 Classification of original tweets using categories from Schwenk *et al*[5]: scientific (contained education, shared conference-related content, or other form of medical education; logistical (broadcasted information such as an announcement about an upcoming conference or job opening); social (general thoughts, banter or conversation, and replies); or other (any tweet that did not obviously fall into one of the other three categories, including advertising tweets). P values are derived from the χ^2 test with Yates correction.

Table 1 Top 10 influencers of #regionalanesthesia or #regionalanaesthesia by number of tweets and number of impressions

By tweets				By impressions			
Pre		Post		Pre		Post	
amit_pawa	85	cdrrogers	55	amit_pawa	598 400	MDJobSite	361 725
crnajobsite	47	crnajobsite	49	MDJobSite	340 830	ASRA_Society	194 264
RegionalAnaesUK	45	MDJobSite	35	EMARIANOMD	279 422	EMARIANOMD	134 860
MDJobSite	35	medovate	18	RegionalAnaesUK	244 710	amit_pawa	106 890
EMARIANOMD	22	ASRA_Society	14	ASRA_Society	92 358	RegionalAnaesUK	64 064
LSORA_UK	19	amit_pawa	14	Anaes_Journal	88 332	anesthesianews	57 894
Steve_Coppens	18	dr_rajgupta	12	ESRA_Society	82 264	cdrrogers	48 510
claralexlobo	13	RegionalAnaesUK	11	LSORA_UK	82 137	dr_rajgupta	43 644
canestezi	12	EMARIANOMD	10	Wilkinsonjonny	40 344	crnajobsite	42 140
Abelgavino	11	KalagaraHari	9	TomVargheseJr	38 128	BJAJournals	25 386

Individual other health showed the largest tweet increase (+48 tweets), from 1.3% (10/780) pre to 11.9% (58/488) post ($p<0.001$). Cohen's kappa statistic was 0.796 ("substantial" agreement between reviewers)[6] for the categorization of 420 original tweets. From pre to post, the proportion of "other" tweets increased (figure 1). All 20 tweets in the "other" category were medical device advertisements.

Comparison of influencers

The top 10 influencers of #regionalanesthesia or #regionalanaesthesia in the pre and post intervals are shown in table 1.

DISCUSSION

This study reveals a focus shift within the RAAPM Twitter community since COVID-19 arrived with fewer mentions of the opioid epidemic and more industry advertisements using regional anesthesia hashtags. However, an *overall* decrease in activity among the top 10 influencers also occurred, which may relate to increased clinical demands on anesthesiologists during COVID-19 or an appropriate change in topical priorities to personal protective equipment and critical care skills. Given the ongoing overlap of the COVID-19 pandemic and opioid epidemic, we encourage physicians in the RAAPM Twitter community to continue to use these hashtags to help disseminate information on opioids and nerve blocks as elective surgeries and normal clinical activities resume.

Twitter Eric S Schwenk @ESchwenkMD, Kellie M Jaremko @Neuro_Kellie, Rajnish K Gupta @dr_rajgupta, Amit Pawa @amit_pawa and Edward R Mariano @EMARIANOMD

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REFERENCES

1 Gai N, Matava C. Twitter Hashtags for Anesthesiologists: building global communities. *A A Pract* 2019;12:59–62.
2 Jenkins WD, Bolinski R, Bresett J, *et al*. COVID-19 During the Opioid Epidemic - Exacerbation of Stigma and Vulnerabilities. *J Rural Health* 2020. doi:10.1111/jrh.12442. [Epub ahead of print: 11 Apr 2020].
3 Hawksey M. #TAGS History, #TAGS, 2014. Available: https://tags.hawksey.info/about/ [Accessed 26 May 2020].
4 Utengen A. Healthcare Stakeholder segmentation, Symplur, 2020. Available: https://help.symplur.com/en/articles/103684-healthcare-stakeholder-segmentation [Accessed 26 May 2020].
5 Schwenk ES, Jaremko KM, Gupta RK, *et al*. Upgrading a social media strategy to increase Twitter engagement during the spring annual meeting of the American Society of regional anesthesia and pain medicine. *Reg Anesth Pain Med* 2017;42:283–8.
6 McHugh ML. Interrater reliability: the kappa statistic. *Biochem Med* 2012;22:276–82.