Violence against nurses in the emergency department: an observational study

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ABSTRACT

Objective This study aimed to evaluate the number and risk factors of violent events encountered in the emergency department. An observation grid was developed following interviews with emergency department staff to target the most pertinent information to collect in a prospective study design.

Design Observational study.

Setting Emergency department of a tertiary hospital in France.

Outcome measures Number of violent events occurring during a single shift, recorded over 6 months by two observers. Information collected included time and date of incident; number of male/female staff; number of patients and companions present in the service and the waiting room and length of staff debriefing. Perpetrator, victim and patient information were collected. Victims were followed-up 72 hours later.

Results Eighty-two periods were observed between November 2015 and April 2016 recording 35 violent incidents affecting 37 perpetrators and 48 victims, equally distributed over the days of the week and months of the year. The median interval until violence was 0 [0–96] min from entry. Eight (23%) events were officially reported, with two (6%) resulting in charges being pressed. No risk factors were significantly associated with violent incidents in multivariate analysis, although there was a tendency towards significance for fewer senior female doctors present (p=0.0712) and a resulting longer debriefing session (p=0.0712).

Conclusions We confirm the high rate of violence in the emergency department and poor level of official reporting. Strategies should be implemented to anticipate and reduce incidence and encourage reporting by affected staff.

Trial registration number NCT02116439.

INTRODUCTION

The cause of violence in the emergency department is multifaceted, and its prevention is complicated. Medical staff are frequently exposed to violence from patients and their companions, with studies showing that up to 80% staff have experienced violence. Results from studies of violence against emergency services personnel have given conflicting data on which people are most at risk, with contradictory reports showing higher rates of violence depending on gender and level of experience. One prospective survey showed that 78% of staff had experienced a violent event, with verbal aggression being the most common form, followed by physical assault. Indeed, verbal aggression was so frequent that nurses perceived this as an almost inevitable part of their job. Surveys of violence according to hospital service have found that staff in the emergency department experience the highest levels of violence. Several of the identified risk factors for violence, such as patient pain, alcohol and drug use and long waiting times, are not limited to the emergency department, but are common throughout the service.

Most of the studies published in this domain are retrospective studies, thus risking recall bias, or only for short-term durations or surveys with low response rates with likely selection bias. Thus, prospective studies over several months are essential to gather the most accurate data. However, addressing the problem of violence in healthcare institutions requires caution and prior definitions because violence is protean and subjective. An ideal solution would be to define the types and severity of anticipated violent events prior to data collection according to interviews with emergency room staff. Violent events should then be recorded by trained observers using structured data collection tools derived from the points raised in the
interviews. Such observational data collection designs are well adapted to emergency department research and have been previously applied to study emergency medical services handoff, patient flow, fundamentals of care and use of personal protective equipment.10–13

The aim of this study was to prospectively record the number of violent events in the emergency department occurring in each work period and to determine whether there were any risk factors influencing the incidence of such events, according to a predetermined definition of expected events.

**METHODS**

Study design

This study forms the second part of a two-part evaluation of violence experienced by nurses in the emergency department. The first part comprised the analysis of nurses’ experiences (types of violence and severity) used to generate the observational chart used in this study (online supplemental file 1). The results of the interviews will be published in a separate article. The study here was an observational study of violent incidents in the emergency department. This observational design is adapted to data collection of events in context, in a real-life scenario.14

**Settings**

The observations were conducted between November 2015 and April 2016 in a single university hospital in Southern France. Observation period duration was 7.5 hours for the daytime observations and 10 hours for the night observations, linked to shift changes: morning (06:15–13:45), afternoon (13:30–21:00) and night (20:30–06:30). The observation periods began and ended with an oral information exchange (15 min in daytime and 30 min for night shifts). The periods of observation were randomly distributed across the 6 months for a total of 30 full days. Ninety observations were scheduled.

**Outcomes**

The primary outcome was the number of violent events occurring in each observational period. Secondary outcomes were frequency of events of each level of gravity (A–D) in the reception area.

A procedure for recording of violent events was established whereby all incidents had to be declared within 48 hours following the incident. Staff encountering a violent event were instructed to: (1) inform nearby personnel, the nearest senior staff, a replacement or the on-call staff member; (2) contact the security department; (3) if the victim required medical attention, to consult the senior doctor of the service to sign a medical certificate for an accident at work and (4) to complete an accident at work declaration within 48 hours. The incident was signalled to the department of quality and professional risk. Victims were recontacted 72 after the incident to determine the effects of the incident and gather follow-up data (declaration signed-off work).

**Data sources/measurements**

Two registered nurses were hired to act as non-participant observers for this study. These plain-clothed observers were placed in the two main sections of the emergency department: traumatology and medico-surgery, both of roughly the same size with similar numbers of patients. Each remained in their allocated area for the duration of the observation period. The information collected was:
date of event; day of the week; hour of start of incident; number of male and female nurses, nursing assistants and doctors present in the service; number of patients and accompaniers present in the service at the start and end of the incident; number of accompaniers in the waiting room at the start and end of the incident; start and end time of oral debriefing. For each incident, information about the perpetrator was collected: age; sex; patient or accompanier; reason for visit and time waiting before the incident. Gravity of patient on arrival was measured on a 1–5 scale, and patient-declared pain level was described on a 0–10 scale. Characteristics of patients involved in violent events were listed for: drug/alcohol inebriation; anxious or agitated state; behavioural problems and physical or mental problems.

Information collected for the victims at the time of the incident was: age; sex; years of experience and job title. Information collected during the follow-up call at 72 hours was the difference between observer’s notes and the victim’s recollections and any follow-up data. Incidents were categorised by injury against people or furnishings according to the evaluation chart from level A for serious violence (including rape and armed attacks) to level D (including verbal attacks and graffiti) (table 1).

**Bias**
To reduce bias, the observers were not involved in the creation of the observation chart. Two observers were present each shift to prevent non-recording of a second event should the first observer be occupied. Observers did not wear uniforms.

**Patient and public involvement statement**
A representative selection of personnel working in the emergency department was interviewed about their experience of violence at work in order to define the outcome measures for this study. Patients were not involved in the design of the study.

**Statistical methods**
All statistical analyses were performed using SAS Enterprise Guide V.7.1 (SAS Institute, Cary, NC, USA). Categorical variables were expressed as proportions and compared using χ² tests or Fisher’s exact tests. Continuous variables were expressed as means and SD or medians and quartiles and compared using Student’s t-test or Wilcoxon-Mann-Whitney test, depending on their distribution.

The proportion of observation periods with violent events was presented with 95% CI calculated with the binomial exact method. Multivariate logistic regression was used to identify the risk factors for violent events. Risk factors entered into the multivariate model were selected at a threshold of 25% in univariate analysis. Backward selection was performed to select risk factors at a threshold of 5%. The impact of these factors is expressed by their OR and 95% CI.

**RESULTS**
In total, 82 observational periods were recorded (figure 1), equally distributed over days of the week and between early, late and night shifts. Between 9 and 19 observations were made per month from November 2015 to April 2016 (table 2). Across the study, the median number of personnel in the service during the observation period was 32 [30; 33], including 1 [0; 2] security staff (all male); 6 [6; 7] female and 1 [0; 2] male nurses; 7 [6; 9] female and 1 [0–2] male nursing assistants; 5 [4; 6] female and 1 [0; 2] male senior doctors; 5 [4; 6] female and 0 [0; 2]
male junior doctors; 1 [1; 1] female and 0 [0; 1] male reception staff and 1 [1; 2] head nurse (all female). The median number of patients and accompaniers present in the service was similar at the start and end of the observational periods: 59 [45; 70] before versus 53 [38; 70] after, and 12 [5; 15] before versus 11 [6; 17] after, respectively. The median number of patients and accompaniers in the waiting room also remained stable, with 2 [1; 5] before versus 1 [0; 4] after and 5 [1; 8] before versus 3 [0; 6] after, respectively. Both the oral briefing and debriefing sessions lasted a median of 15 min.

Incidence of violent events
In total, 35 unique violent incidents were observed involving 37 perpetrators and 48 victims. At least one incident was recorded in 29 of the observed periods (35%). Three observation periods had two events and one had four events, all others were single events. The vast majority (94%) comprised a single perpetrator, with two cases with two perpetrators. In 80% incidents, there was a single victim, but two victims were affected in 11% cases, three in 6% cases and six victims in one case (3%). The majority of violent incidents occurred immediately on arrival at the emergency department: the median delay until incident was 0 [0–96] min. Of the three departments observed, most incidents occurred in the reception area (86% vs 6% in medico-surgery vs 8% in traumatology). Most incidents were level D (lowest) severity events against people (66%), most commonly heckling alone (n=6) and heckling with insults, obstruction and provocation (n=6). Seven (20%) were level C, most frequently threats (n=5); and three (9%) were level B, all intentional violence. No level A incidents were recorded. In addition, 12 events (34%) were level D incidents against property.

Subjects
Fifty-four percent of violent acts were linked to patients aged 18–60, and 26% of the events were associated with patients with psychiatric or physical illness. Characteristics of patients involved in violence are shown in figure 2; notably 40% of the events were linked to patients without alcohol or drug effects, and 60% patients were agitated/anxious. The most common reason for admittance was trauma (53%); domestic accident (n=7), accident in public space (n=4), aggression/brawl (n=4) and suicide attempt (n=2). The majority of incidents were associated with patients without pain (66%), with median pain rated as 5/10 [0–7] for those declaring experiencing pain. According to the severity scale used, the majority of patients had the lowest measure of gravity (level 5; 60%), and none with the highest gravity of 1. The patient was identified as the perpetrator in 54% cases, compared with 14 (38%) accompaniers and 3 (8%) staff. The job title of the staff member was not recorded in two cases and was marked as auxiliary nurse/service personnel in one case. For the 37 perpetrators described, 23 (62%) were between 18 and 40 years old, and 11 (30%) were between 41 and 60 years old. The majority were male (70%). Of the 21 people who intervened to defuse the situation, the vast majority were staff members (90%), with a single case of a patient intervening, one other by an accompanier and one not described.

Figure 2 Characteristics of patients involved in violent events.
Two-thirds (67%) of victims were aged 18–40, with the majority being female 28 (58%). The profession most exposed to violence was nurses (n=15, 32%), followed by reception staff (n=14, 30%), security staff (n=9, 19%) and finally nursing assistants (n=6, 13%). Eight (25%) of the events were declared via the declaration form, of which five involved detailed reports. Nineteen events (54%) had no consequence and two (6%) resulted in charges being pressed.

Risk factors
Analysis of the risk factors found that the number and sex ratio of nurses, nursing assistants or junior doctors had no significant effect on the occurrence or not of a violent event. The number of senior male doctors (p=0.1560), number of senior female doctors (p=0.0574) and number of male reception staff (p=0.1419) were significant at the 25% level for inclusion as potential risk factor in the multivariate analysis. As the ratio of male/female senior doctors was included as two separate input factors, only one was retained for the multivariate analysis. Only the number of patients in the waiting room at the start of the period (p=0.2168) and number of accompaniers in the service at the start of the period (p=0.2043) were retained for multivariate analysis. The length of the first briefing session had no significant effect on the probability of a violent event (p=0.7552), but duration of the second debriefing session (p=0.1058) was retained for multivariate analysis. There was no significant difference in the number of violent events between day of week (p=0.4675) or month of year (p=0.2749) (table 3).

None of the factors was found to be significant at 5% in multivariate analysis, although there was a tendency towards significance for duration of second debriefing session (p=0.0712) and number of senior female doctors (p=0.0787) (table 3).

Follow-up
Of the 48 victims, 16 were successfully recontacted after 72 hours. The victims’ interpretation of the severity of the incident largely correlated with the observations made by the observer at the time of the incident, however only four victims completed the declaration form, thus the level of missing data for this section prevented thorough analysis.

DISCUSSION
Our results confirm that violent events are frequently observed in the emergency department, with at least one violent incident occurring in over a third of the observational periods. Interestingly, no difference was seen in frequency of violent incidents between the different shifts. This is in contrast with a US study showing that the majority of violence occurred at night,4 and an Australian study showing more incidents in the evening,15 but supports a 2013 study also showing no impact of time of day on violence incidents.16 An Iranian study found that violence was associated with the days on which visitors were allowed.17 Surprisingly, the majority of violent events recorded in this study occurred during the week (80%). Duration of the events was not recorded in this study.

The profile of perpetrators was similar to other studies: male, in the 18–40-year-old bracket, and often under the influence of drugs or alcohol.6 18 Anxiety and agitation were leading factors in the onset of the violent act or event, but the nature of the study could not determine whether these symptoms were associated with or symptomatic of psychiatric illness. A study of Australian nurses identified six distinct groups of perpetrators, with specific triggers for the violence (eg, smokers refusing to stop smoking in non-designated areas, or ‘copy-cats’ who believe that aggression will reduce their waiting time), each requiring different intervention to de-escalate aggression.19

The severity of the violence was most commonly low, classified as level D, most frequently heckling. This corresponds with the other studies in the field where the violence was predominantly verbal.3 Fortunately in our study, no level D severity events were recorded. This may arise partially from social constraints, where the population is aware of the penalties for physical aggression and firearms are not permitted or easily available.

In our study, patients were the perpetrators in 54% of violent events, in line with previous data showing that the majority of events were committed by the patient,6 however other studies have found that accompaniers were more likely to incite violence.17 20 Perhaps surprisingly, 60% of events were associated with patients with the lowest gravity score, and 66% to patients without any pain. This is in keeping with the perception noted by a focus group study of emergency department nurses, who reported that patients in the poorest condition had the lowest level of violence.19 However, a meta-analysis found great heterogeneity between studies in the prevalence of violence between different staff members in terms of job title and sex.21

There is a perception among nurses that the presence of a security guard acts as a deterrent to violence, although they needed to be easily observable.22 In this hospital, two security guards were on duty at a time, one at the desk and one on patrol. However, the presence or absence of a member of the security team was not associated with violence here. Certain risk factors identified in other studies linked to violence, for example, long waiting time,23 were absent; indeed most events occurred immediately on entry into the department in the reception area. One of the top causes of violence is frustration,24–26 however, as perpetrators were violent on arrival, this frustration could not have arisen from an excessive wait to be seen. A point raised by Italian emergency nurses was that many of the most aggressive people in waiting areas ought not to have been there, and were abusing the emergency services.20

A previous study has suggested that patients unfamiliar with the hospital environment were more impatient than those who frequently attended, thus this study within an emergency department would have been more likely
Table 3  Univariate and multivariate analysis of factors associated with violent events

<table>
<thead>
<tr>
<th></th>
<th>No violent event (n=53)</th>
<th>At least one violent event (n=29)</th>
<th>P value Univariate analysis*</th>
<th>P value Multivariate backward elimination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of female senior officers</td>
<td>1(1; 2)</td>
<td>2(1; 2)</td>
<td>0.6552</td>
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</tr>
<tr>
<td>Number of female nursing assistants</td>
<td>7(6; 9)</td>
<td>8(5; 9)</td>
<td>0.8747</td>
<td>NA</td>
</tr>
<tr>
<td>Number of male nursing assistants</td>
<td>1(0; 2)</td>
<td>1(0; 2)</td>
<td>0.8653</td>
<td>NA</td>
</tr>
<tr>
<td>Number of female staff at reception</td>
<td>1(1; 1)</td>
<td>1(1; 1)</td>
<td>0.9954</td>
<td>NA</td>
</tr>
<tr>
<td>Number of male staff at reception</td>
<td>0(0; 1)</td>
<td>1(0; 1)</td>
<td>0.1419</td>
<td>0.3188</td>
</tr>
<tr>
<td>Number of senior female doctors</td>
<td>5(4; 6)</td>
<td>4(3; 5)</td>
<td>0.0574</td>
<td>0.0787</td>
</tr>
<tr>
<td>Number of senior male doctors</td>
<td>1(0; 2)</td>
<td>2(0; 3)</td>
<td>0.1560</td>
<td>NA</td>
</tr>
<tr>
<td>Number of junior female doctors</td>
<td>5(4; 6)</td>
<td>5(4; 6)</td>
<td>0.9565</td>
<td>NA</td>
</tr>
<tr>
<td>Number of junior male doctors</td>
<td>0(0; 2)</td>
<td>1(0; 2)</td>
<td>0.8373</td>
<td>NA</td>
</tr>
<tr>
<td>Number of male security staff</td>
<td>0(0; 2)</td>
<td>1(0; 2)</td>
<td>0.5001</td>
<td>NA</td>
</tr>
<tr>
<td>Number of female nurses</td>
<td>6(6; 7)</td>
<td>6(5; 7)</td>
<td>0.5479</td>
<td>NA</td>
</tr>
<tr>
<td>Number of male nurses</td>
<td>1(0; 2)</td>
<td>1(0; 2)</td>
<td>0.7189</td>
<td>NA</td>
</tr>
<tr>
<td>Number of personnel</td>
<td>32(31; 33)</td>
<td>32(30; 33)</td>
<td>0.5723</td>
<td>NA</td>
</tr>
<tr>
<td>Length of staff briefing session at start of shift (minutes)</td>
<td>15(15; 15)</td>
<td>15(15; 15)</td>
<td>0.7552</td>
<td>NA</td>
</tr>
<tr>
<td>Number of patients present at start of period</td>
<td>59(43; 69)</td>
<td>59(46; 73)</td>
<td>0.4462</td>
<td>NA</td>
</tr>
<tr>
<td>Number of patients in waiting room at start of period</td>
<td>2(1; 5)</td>
<td>3(1; 7)</td>
<td>0.2168</td>
<td>0.7623</td>
</tr>
<tr>
<td>Number of accompaniers present at the start of period</td>
<td>10(5; 14)</td>
<td>12(6; 16)</td>
<td>0.2043</td>
<td>0.7623</td>
</tr>
<tr>
<td>Number of accompaniers in waiting room at start of period</td>
<td>4(1; 8)</td>
<td>5(1; 8)</td>
<td>0.6960</td>
<td>NA</td>
</tr>
<tr>
<td>Length of staff debriefing session at end of shift (minutes)</td>
<td>15(15; 20)</td>
<td>15(15; 15)</td>
<td>0.0712</td>
<td>0.1058</td>
</tr>
<tr>
<td>Number of patients present at end of period</td>
<td>53(38; 67)</td>
<td>54(38; 72)</td>
<td>0.5845</td>
<td>NA</td>
</tr>
<tr>
<td>Number of patients in waiting room at end of period</td>
<td>2(0; 4)</td>
<td>1(0; 5)</td>
<td>0.8841</td>
<td>NA</td>
</tr>
<tr>
<td>Number of accompaniers present at the end of period</td>
<td>12(8; 15)</td>
<td>10(4; 20)</td>
<td>0.6357</td>
<td>NA</td>
</tr>
<tr>
<td>Number of accompaniers in waiting room at end of period</td>
<td>3(0; 6)</td>
<td>1(0; 6)</td>
<td>0.5740</td>
<td>NA</td>
</tr>
<tr>
<td>Day of the week</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>5 (9%)</td>
<td>6 (21%)</td>
<td>0.4675</td>
<td>NA</td>
</tr>
<tr>
<td>Tuesday</td>
<td>6 (11%)</td>
<td>7 (24%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>11 (21%)</td>
<td>3 (10%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>7 (13%)</td>
<td>4 (14%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>9 (17%)</td>
<td>3 (10%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>7 (13%)</td>
<td>3 (10%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td>8 (15%)</td>
<td>3 (10%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Month</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>8 (15%)</td>
<td>8 (28%)</td>
<td>0.2749</td>
<td>NA</td>
</tr>
<tr>
<td>February</td>
<td>12 (23%)</td>
<td>6 (21%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>March</td>
<td>11 (21%)</td>
<td>8 (28%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>10 (19%)</td>
<td>1 (3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>November</td>
<td>5 (9%)</td>
<td>4 (14%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>December</td>
<td>7 (13%)</td>
<td>2 (7%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data presented as median (IQR).
*Cut-off for significance<0.25
NA, not applicable.
to find inexperienced patients with a potentially lower threshold for frustration.25 In this study, 30% of the violent incidences were linked to alcohol intoxication, yet other studies have suggested that inebriated patients are not necessarily more threatening that sober patients.26 A comparison cannot be made against the patients not participating in violence as this marker was only recorded in violent incidences, but 40% of incidences were not influenced by alcohol, demonstrating that alcohol is not an essential component triggering violence. None of the risk factors investigated for this study were identified in multivariate analysis as being significantly associated with violent events, making it difficult to determine strategies to avoid violence in the future. In the absence of specific risk factors to predict events, general interventions to reduce violence should be considered, as described in previous studies.27 Both patients’ relatives and nurses independently suggested public awareness campaigns to education the public of how emergency rooms operate independently. Suggested public awareness campaigns to reduce violence should be considered, as described in previous studies.27 Such programmes could be provided to newly arriving staff and renewed as necessary.

A tendency was seen for increased violence when fewer senior female doctors were present (p=0.0787). Similarly, there was a trend towards significance for longer debriefing sessions when violence occurred (p=0.0712), although this most likely represents a consequence rather than a cause of the incident. In line with other studies,3 very few incidents were formally reported. Staff may choose not to report violence in the absence of an injury, especially when they feel there will be no repercussions, for example if the perpetrator is very old or ill, or they may not be familiar with the reporting system.30,31 However, in this study, most of the perpetrators were not very old or ill. Previous studies have shown that victims also frequently state that violence is considered normal patient behaviour and thus does not warrant reporting.32 Interestingly, in the Copeland and Henry study, 14% of victims stated that they did not report violence as it was unacceptable. Interventions should be trialled to reduce violence, including public awareness campaigns. Staff should be encouraged to report all violent events, and they should systematically receive training on how to diffuse and avoid violent incidents, with support available for personnel experiencing a violent incident. Future studies would be more comparable if a consensus violence-scoring instrument were developed.

It would be logistically very complicated to collect the characteristics of all the individuals present in practice. We did not interview subjects to understand their motivation. A study on patients’ relatives’ perceptions showed that perpetrators reacted to many stress factors, including a lack of information and the perceived attitudes of the staff.28 It would be particularly interesting to have some context on the three cases in which the violence was initiated by a staff member. The study by Shafran-Tikva et al. highlighted that staff experienced the same emotions as patients which accumulated to result in violence, such as frustration, fear and loss of control.29

The strength of the study was the preliminary interviewing stage, leading to the construction of the violent incident observation form. This form allowed violent incidents to be recorded prospectively, avoiding recall bias, which is a major limitation in the published literature. As a meta-analysis signalled the difficulties in comparing studies due to the different definitions given for violent acts,31 we tried to overcome this limitation by using clear terminologies and examples for the different acts on our observation form.

The research gap identified by this study is the motivation for violence by the perpetrators. Designing a study to assess the perception of the perpetrators will be complex, especially due to the high heterogeneity of the types of perpetrators (patients, companions, etc.). Nevertheless, this knowledge is essential to develop targeted strategies to reduce violence and keep staff safe.

Conclusion

Violence in the emergency department is routine but unacceptable. Interventions should be trialled to reduce violence, including public awareness campaigns. Staff should be encouraged to report all violent events, and they should systematically receive training on how to diffuse and avoid violent incidents, with support available for personnel experiencing a violent incident. Future studies would be more comparable if a consensus violence-scoring instrument were developed.

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Contributors MC: conceptualisation, investigation, visualisation, writing—original draft; SA: formal analysis, writing—review and editing; JP: investigation; SK: visualisation, writing—original draft; CD: methodology, formal analysis; PF-P: methodology. All authors reviewed the final version of the manuscript. MC accepts responsibility for the integrity of the data and the accuracy of the data analysis. The funder played no role in the study design; in the collection, analysis and interpretation of data; in the writing of the article; or in the decision to submit the article for publication.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination plans of this research. Refer to the Methods section for further details.

Patient consent for publication Not required.
REFERENCES


