

EXPERTS' OPINION

Pain management in victims of disasters

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ABSTRACT

Pain is widely studied and is considered a major clinical, social, and economic problem worldwide, although it remains poorly understood. For disaster victims, the complex picture, biologically, psychologically, and socially, only makes the situation even more complicated. This narrative review aims to describe specific aspects of pain and pain management in disaster victims. We reviewed relevant literature, both on pain management and selected specific data related to conflict victims. We discuss the complexity of the picture, its different aspects, and mechanisms. We discuss the limitations of current approaches and propose a simple strategy, including mitigation plans, all illustrated by a case study based on a personal experience in the Gaza Strip in 2022. The vulnerability factors are well known, as well as the tangle of intense acute pain and the persistence of pain in the subacute and chronic phase. However, the management of acute pain is, in a disaster context, more constrained than chosen. Empirical evidence suggests a focus on modifiable risk factors as well as the evaluation of strategies guiding future management. This management may depend on obstacles and barriers, linked to the context of the disaster, the availability of medicines, techniques, skills as well as linguistic and cultural barriers. Our proposal includes systematic assessment and, in a later phase, tailored and personalized treatment. In the chronic phase of rehabilitation and follow-ups, the essential place for management of psychological and social aspects become predominant. In disaster areas, including during and after conflict, the management, and recommendations for the management of acute and chronic pain are complex, distinct but interdependent. Acute pain must be systematically assessed and treated while personalized care pathways are desirable at a later stage. Psychological and social considerations are essential. Data collection should be systematically considered.

(Cite this article as: Mitchell J, Forget P. Pain management in victims of disasters. Minerva Anestesiologica 2024;90:573-80. DOI: 10.23736/S0375-9393.23.17818-7)

KEY WORDS: Pain; Pain management; Disasters.

For several decades, humanitarian medicine has developed and continues to develop, attempting to deal with pandemics, epidemics, natural disasters, armed conflicts, support for refugees or regions of the world suffering from deprivation of health care. During these humanitarian events which constitute life experiences and define contexts, pain management must be able to adapt and respond to the resulting constraints. As of 2020, the revised International Association

of the Study of Pain definition of pain is “an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage.”¹ This definition was accompanied by a note emphasizing the fact that pain is always a personal experience influenced to varying degrees by biological, psychological, and social factors. Also, through their life experiences, individuals learn the concept of pain, and this painful experience must be respect-

ed.¹ In view of this definition and these accompanying notes, and while pain is widely studied and is considered a major clinical, social and economic problem throughout the world, it remains poorly understood, both in terms of pathophysiology and treatments.² For disaster victims, the complex picture, biologically, psychologically and socially, only makes the situation even more complicated. Improved concepts and methods are needed to study pain from a population perspective and continue the development of pain prevention and management strategies.² There is no doubt that this element is even more relevant in conflict/disaster zones. In this article, we will narratively describe specific aspects of pain and pain management in disaster victims, to guide clinicians and decision-makers and, finally, to identify the remaining knowledge gaps.

Pain remains an unresolved issue

Pain remains an unresolved problem with its many consequences such as hyperalgesia or allodynia. Many animal models using different stimulating agents such as capsaicin, formalin, carrageenan, or complete Freund's adjuvant have been developed to study pain in animals. Specific methods have been created to imitate and study pain and its pathophysiological consequences in animals due to a surgical incision for different types of surgery performed on humans. Additionally, in animals, models of neuropathic pain, such as spinal nerve crush, spinal nerve ligation/transection, or spared nerve injury, have been created. These models showed hypersensitivity to pain that could last for several months. Models mimicking surgical incisions showed shorter durations of pain hypersensitivity. Trauma victims present with complex injuries, dramatically different from injuries caused by surgical incisions. The properties of their pain are therefore also different in intensity, duration, and evolution over time.³ Clinical studies have identified factors that can be evaluated in the presurgical period and are predictive of the development of chronic pain. These factors, considered as vulnerability factors, include the patient's physical condition, the duration of the surgical procedure, age and gender, obesity, and psychological factors such

as anxiety, stress, psychological vulnerability, depression, or catastrophizing. These vulnerability factors are also found among people who are victims of disasters. For example, the impact of chronic stress and psychological factors play a major role in the establishment of chronic pain of non-surgical etiology. However, classic models used in this context include chronic strain stress or chronic mild stress, which involves the alternating use of different stressors, usually unpredictable in terms of nature, duration and/or frequency.³ Although it is difficult to assert that exposure to chronic stress (such as in cases of conflict/war) similarly alters pain thresholds or responses, it is likely that exposure to chronic stress due to a conflict context has an important influence in this context. Especially since we find in this sentence elements which characterize the daily life of people who are victims of conflicts such as deprivation of food, deprivation of water. Additionally, the type of pain management and anesthetics used during surgery have also been shown to influence the likely development of chronic pain.³ It is entirely possible that the drugs used to treat victims of trauma due to disasters could also be a factor favoring the persistence of pain even if, as a general rule, the analgesic/anesthetic strategy is more constrained than chosen, the context being also tending to focus on acute pain management.

From acute to chronic pain in disaster victims

The intensity of postoperative and post-trauma pain may be one of the factors determining the occurrence of chronic pain. However, in conflict situations, even if the primary goal is to treat acute pain, prevention of chronic pain in this type of setting might be considered even more important than during elective surgical procedures. In these conflict zones, the management of acute pain is already complicated by the elements we cite below (supply, storage, hygienic conditions, etc.), which implies careful consideration regarding resources allocation to treat acute problems, but also to prevent the predictable onset of chronic pain. The authors' experience confirms that, even during acute armed conflicts, parts of

situation, the constraints are varied and linked to the settings, patients, and professionals. Supply limitation is typical constraint linked to settings, particularly for opioids, including difficulties in sourcing, storing, prescribing, and dispensing the drugs, although this is often true for non-opioids as well.⁴ Other constraints influence the difficulty of reaching the disaster site and practical, logistical aspects, that are beyond the scope of this work. The number of victims and the number of victims to be treated in the same period of time as well as the different types of injuries such as fractures, lacerated, bruised or incised wounds, deformities or dislocations of joints, caused directly or indirectly by the disaster are obviously typical issues. Many victims with a variety of injuries, often serious, such as crush injuries, can have a significant impact on the response. In this context, it is clear that the limitation of training in the diagnosis and treatment of the majority of painful conditions by medical and nursing staff remains problematic.⁴ In these major emergencies during disasters or conflicts, there is some evidence that health care providers are not professionally prepared to adequately address pain issues at the psychosocial level.^{4, 5} This includes a variety of risks related to the beliefs and experiences of patients but, also, professionals. For patients, contrasting situations have been described in the literature, including cases of increased pain threshold, particularly among young people (young people tirelessly rescue people buried under rubble in the first hours following the disaster). Conversely, a reduction in the pain threshold linked to positive modulators can be observed, such as ancestral fear of death, deprivation of sleep, food and intimacy, mourning, loss of home and social relations.⁴ Professionals may have their own background and experience, such as opiophobia, influenced by an acute experience of a stressful and hostile environment (such as tent life, atmospheric agents, a wide range of temperatures, small and uncomfortable beds, heavy physical work, daily life in an emergency situation).⁴

Limitations of the current approaches

The World Health Organization (WHO) ladder is obviously very often applied in disaster situations, but is often inapplicable, particularly for neuro-

pathic pain, and is incomplete given the complexity of the pain.⁶ Different forms of pain are often underestimated during disasters and are usually complex, both nociceptive and neuropathic. A liberal attitude in the administration of strong opioids and ketamine has been recommended, in order to improve acute pain management and, possibly, to reduce the possible occurrence of chronic pain.⁷ Regarding neuropathic pain, the mechanism of which is known to be complex, pain can now be considered as a combination of peripheral and central modifications, linked among other things to the activation of immune cells in the dorsal root ganglia and spinal cord. The release of pro- and anti-inflammatory cytokines, as well as hyperalgesic and analgesic mediators, implies that treatment must be multimodal to be effective.^{3, 5} Very concretely, it would always be necessary to include an evaluation of the location of the pain, its quality, its intensity and its temporal variation, its functional impact on mood, sleep and daily life. Responses to previously attempted treatments, and coexisting substances use must be considered. It is important to articulate this point that clinical assessment should focus on excluding treatable conditions, confirming the diagnosis of neuropathic pain, and identifying clinical features that could help individualize treatment, this which has direct consequences in the event of a disaster.⁷ Additionally, some conditions may be treated with specific modalities, such as gabapentin, pregabalin, tricyclic antidepressants, selective serotonin and norepinephrine reuptake inhibitors, and topical lidocaine as first-line agents. It would also help limit the use of opioids, if possible, to clinical situations such as acute pain, where ketamine most likely has a place of choice.⁵ However, it is clear that, in extremely constrained environments, a realistic approach is often the only option.

Realistic pain management: a proposal from systematic assessment to personalized follow-up

Medicines most often used for the treatment of acute pain in disasters include the WHO first class analgesics, namely paracetamol, non-steroidal anti-inflammatory drugs and opioids, often in combination.⁴ The synergistic mechanism of

the combination facilitates adequate pain control while minimizing doses and side effects. Faced with a high prevalence of severe pain, strong opioids should not be used as monotherapy. The need for greater availability of narcotics during a natural disaster is obvious but cannot be the only answer to pain management, knowing that even in patients with moderate to chronic pain severe, tolerance to opioids develops quickly and these drugs must be considered as relief and short-term treatment.⁸ In addition, weak opioids are not always ideal, knowing that their variable metabolism (codeine and tramadol) makes their effectiveness and safety not necessarily optimal.³

Knowing that, in disasters, opioids are generally the drugs of first choice in the field (and most easily accessible). Opioid sparing is necessary, but, at the same time, it is difficult to advise limiting the use of opioids. It is therefore appropriate to propose a liberal approach towards opioids, while recommending the development of alternatives, in parallel, such as ketamine and locoregional analgesia, as well as the early detection of neuropathic components. This requires a good understanding of pain management pharmacology, according to different situations, and a framework is proposed in the following paragraphs.

First, in hyperacute contexts, and as soon as possible, assessment and triage play a central role. This should be systematic, rationalized, accessible to non-specialist, and able to guide further management. We propose to systematically consider, and capture data, both at patient- and organization levels, on:

- the causes, kinetics of the types of admissions, over time, after the disaster;
- the types of lesions, the types of pain, the treatments initiated, the responses to their treatments;
- the compliance of patients and the possibility of their monitoring.

These data should guide patient care but should also be able to be collected and archived for quality improvement and research purposes. Treatment should be immediately initiated in case of severe pain. Morphine should be preferred in cases of intense, and therefore often acute, pain, in combination with ketamine, these

drugs often being the most available in the conflict zone and at the time of a disaster. Protocols should be simple, adapted to the local context and its use should be monitored.

As a second stage of care, as soon as the patient and his pain have stabilized, an approach based on paracetamol and NSAIDs is recommended, with opioids available as rescue. Titration of small doses of morphine can be used. Weak opioids are sometimes easier to use but are not free from side effects (especially risk of nausea and vomiting as well as long-term dependence). Beyond the pharmacological arsenal that must be available, we must consider being able to implement as quickly as possible a systematic approach to the organization of pain management. This includes ongoing assessment and reassessment which may be complicated by the above-mentioned issues such as language and cultural barriers, as well as local constraints.

A third stage occurs during the following days. The role of multimodal care is already evident at this stage of subacute pain, both for a question of effectiveness, of being able to reduce the doses of each type of medication but also for the prevention of chronic pain:

- in cases of insufficient pain management, ketamine can be reintroduced, or even other agents such as nefopam, gabapentinoids (neuropathic pain) and clonidine, if available;⁹
- the use of loco-regional anesthesia, although ideal in a multimodal approach, is however not always easy given the availability of drugs or the equipment necessary for their use, in this type of context, even if Additional investments would be justified given the significant potential.¹⁰

After days to weeks, pain may persist and present a favorable trajectory. The risk of chronic pain increases, implying that treatment should be multimodal and multidisciplinary. At this stage, it should be more specialized and personalized. It should include pharmacological treatment, rehabilitation, and psychological support:

- antidepressants and anticonvulsants have an analgesic action, and their treatment regimen then extends over several weeks. The difficulty in “disaster” terrain is then to be able to monitor patients who, in regions with a failing health system and sometimes for cultural reasons, are

not in the habit of requesting medical monitoring. These medications also have many interactions and side effects, sometimes limiting their use. This can lead to lower treatment compliance by patients or limited usefulness regarding the complicated follow-up;¹¹

- it is essential to integrate early, if possible, physical, and psychological rehabilitations, as well as social support.^{12, 13} Screening and health education units for patients are recommended. Sleep disorders and suicidal thoughts are common in disaster survivors;¹¹

- it is also clear that management of psychiatric complications, including post-traumatic stress disorders and secondary depression, is essential. International guidelines for the treatment of torture victims suggest that addressing emotional factors would improve treatment outcome in many cases.^{13, 14}

A case study in the Gaza Strip in 2022

Context

The Gaza Strip is a Palestinian territory with a total area of 365 square kilometers and populated by nearly two million people, making it one of the most densely populated areas in the world. Israel, which occupied Gaza in 1967, retains control of the airspace, waterfront, vehicle, and pedestrian access to the coastal enclave. From March 30, 2018, until the end of 2019, Palestinians organized the Great March of Return (GMR), calling for the Palestinian right of return and an end to the Israeli blockade. Numerous armed clashes during this period caused more than 3,000 victims in a context of poverty, extremely high unemployment rates and limited resources (water, fuel, and electricity) which quickly led to the overload of infrastructure and facilities resources of the MOH (Ministry of Health). Doctors Without Borders has been present in Gaza since 2000 but the GMR events led to the amplification of its activity in the Gaza Strip. In 2018, MSF established an orthoplastic and reconstructive surgery mission at Al Awda Hospital, for elective surgical procedures, including pediatric activities and rare emergencies. Although initially started to treat cases of surgical reconstruction (65 surgical

cases/month the first year), the evolution of the mission and the needs on site led to the establishment of a controlled antibiotic therapy program for deal with cases of osteomyelitis, the establishment of a hospitalization unit, outpatient consultations (Indonesian Clinic), the development of a rehabilitation and physiotherapy program, as well as the appearance of a psychological support unit (Mental Health), all in a context of multidisciplinary pain management. In order to promote this activity on site, the team must be made up of national staff and expatriate staff, both medical and paramedical, as well as technical, logistical and administrative support.

Management: opportunities, obstacles, and mitigation plans

Such cases of surgery in such a context require rapid and optimal pain management and early consideration of the possibility of developing chronic pain. Also, in order to face this challenge, the means implemented were focused on protocols based on multimodal, preventive and multidisciplinary care. Medical therapeutic means are limited by the supply capacity of the arsenal of drugs, both quantitatively and qualitatively. Protocols are established but modifications to these can be complicated by the possibility of seeing on-site national staff capable of handling the management of more complex techniques or new drugs. Thus, for example, the introduction of clonidine is limited by the possibility of managing side effects in the acute postoperative period or in the hospital unit by national staff. Likewise, for example, the use of locoregional anesthesia by pump *via* the placement of a catheter is limited by the need to ensure that the side effects can also be controlled by hospitalization units which may not be familiarized or trained in the management of this type of practice (management of hypotension or infection of epidural puncture points or loco-regional blockages).

However, collaboration between the different staff (nationals and expatriates) makes it possible to optimize pain through weekly multidisciplinary meetings and the organization of training for national staff by expatriates.

Concerning the profile of patients who can be treated by the mission, even if the majority of pa-

tients will be young adult victims of clashes and presenting injuries following direct armed attacks, a certain percentage of patients, collateral victims of bombings or various attacks, will then be essentially pediatric. Training national staff in the management of this patient population by expatriates is also sometimes necessary.

In this sense – and taking into account the educational aspect of the objectives of a humanitarian mission – we can very well understand the need for relatively substantial experience to be able to consider participating in this type of mission as an expatriate. Indeed, in Gaza as in many places where humanitarian medicine is present, the objectives of the mission are both therapeutic medicines directly helping the disaster victims, and educational objectives for the teams on the ground. And if it is difficult to really quantify the number of years of experience necessary in acute medicine before participating in this type of mission, it is increasingly recognized that substantial experience is required, necessary, even if because once on the ground, in addition to the challenge of caring for the victims, a certain level of stress will contribute to the sometimes reduced capacity of caregivers to face the difficulties on the ground.

In this same context of substantial experience necessary before participating in this type of mission, we can consider the need to be able to master the techniques necessary for optimizing care in acute field medicine; an example is the need already mentioned to be able to consider very early the prevention of the development of chronic pain and its repercussions. Solid experience in algology is not always necessarily present among young doctors. Thus, pain management by loco-regional anesthesia (medications and catheter, ultrasound guidance) but also certain medications (gabapentin, amitriptyline, clonidine) can quickly prove essential.

On a longer term

In a context of disaster, poverty and associated stress, the possibility of being able to manage the repercussions of the use of certain medications can quickly prove necessary in the medium and long term and is the relative responsibility of caregivers; Opioid addiction could indeed be a

In order to be able to counter all these elements which represent the limits to the proper functioning of a humanitarian mission and of medicine in general, of pain management in particular, in disaster areas, we can only insist on the need to optimal organization of missions upstream, on the need for preparation and substantial training of expatriates, on significant collaboration between national and international teams on the ground and on the extreme importance of multidisciplinarity.

Acute pain at the time of trauma should be systematically assessed and treated, even by non-specialists, with the added goal of reducing the risk of chronic pain. During subacute phase, risk factors and specific issues should lead to specialize assessment and personalize pain management. For complex cases, real care pathways must be able to be put in place for better monitoring of patients and optimization of their treatment. Multiple (types of) injuries are common as well as complications, including chronic pain.

In total, the treatment of pain in conflict zones therefore remains a real challenge, the multidisciplinary aspect of which is essential. Many of these aspects are not well documented and studied. This implies that data collection should guide local strategies and quality improvement projects, but also be reused to improve knowledge in the field of medicine and humanitarian care.

- In disaster victims, at the time of trauma, pain should be systematically assessed and treated, even by non-specialists, with the added goal of reducing the risk of chronic pain.
- During subacute phase, risk factors and specific issues should lead to specialize assessment and personalize pain management.
- For complex cases, personalized care pathways should consider the complexity of pain mechanisms, other conditions, as well as the context and the related psychological and social consequences.
- Data collection should be systematic both for quality improvement and research.

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Conflicts of interest

Patrice Forget received speaker and advisory board fees from Grunenthal, Oncomfort and GE Healthcare.

Authors' contributions

Both authors equally contributed to the manuscript, read and approved the final version of the manuscript.

History

Article first published online: January 25, 2024. - Manuscript accepted: December 13, 2023. - Manuscript revised: November 27, 2023. - Manuscript received: October 11, 2023.