

Clinical Review

Torture and its neurological sequelae

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Background: Refugees and asylum seekers continue to enter the United States and the European Union in record numbers. Some have estimated that between 5–35% of all refugees have suffered torture in their countries of origin. Although general practitioners and specialized physicians are likely to encounter victims of torture as patients, few providers are familiar with the health problems that may affect this patient population.

Purpose: To provide neurologists, neurosurgeons, and rehabilitation medicine physicians with basic knowledge about survivors of torture that can help in the diagnosis, treatment, and referral of such patients.

Methods: A MEDLINE (1966–October 2001) search using keywords torture and sequelae (nervous system diseases and brain injuries) was conducted. Other data sources included books, reference lists, online resources and expert opinion.

Findings: Forms of torture that may affect the nervous system include beatings, gunshot wounds, stab wounds, asphyxiation, prolonged suspension and electrocution. Victims of torture commonly experience neurological symptoms such as headaches, vertigo, loss of consciousness and dizziness during and after torture. A successful and meaningful clinical interaction with a survivor of torture includes avoiding retraumatization, building trust, spelling out any limits on confidentiality, and above anything else, establishing empathy with the patient.

Conclusions: Neurological sequelae of torture can be devastating physically and psychologically. The treatment of these neurological conditions does not differ from other patient populations. However, the clinical approach is unique and must focus on avoiding retraumatization and helping the victim reintegrate into society as quickly as possible.

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Introduction

Torture, ‘the deliberate, systematic or wanton infliction of physical or mental suffering by one or more persons acting alone or on the orders of any authority, to force another person to yield information, to make a confession, or for any other reason,’¹ continues to be practiced systematically in more than 120 countries.²

In this article, we review the epidemiology and classification of torture, its forms and neurological sequelae. The article also addresses the clinical approach to survivors of torture with permanent neurological sequelae. The goal of the article is to

provide neurologists, neurosurgeons and rehabilitation medicine physicians with some basic knowledge about survivors of torture that can help in the diagnosis, treatment and referral of such patients.

Epidemiology

Over the past 30 years, the number of refugees (Defined by the United Nations Conference of Plenipotentiaries on the Status of Refugees and Stateless Persons as ‘any person who, owing to a well founded fear of being persecuted for reasons of race, religion, nationality, or membership of a particular social group or political opinion, is outside the country of his nationality and is unable, or owing to such fear, is unwilling to avail himself to the protection of that

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country.) and asylum seekers (A person who asks for a refugee status after entering a host country) has increased rapidly. The United Nations (UN) estimates that there are some 13 million refugees and asylum seekers, although the number may be as high as 50 million if we consider all those who were forcefully displaced from their places of residence.³

Despite an increasing anti-immigrant sentiment in the United States and in the European Union, refugees and asylum seekers continue to enter these countries in record numbers.⁴ For instance, the United States and the United Kingdom received during the 1990s over 1.5 million refugees and asylum seekers, most of whom came from the former Yugoslavia, the former Soviet Union, the Middle East, and the Sub-Saharan region of Africa.⁵ In 2000 alone, the United States received 72 000 refugees and 91 000 asylum seekers.⁶ Once inside a host country, this population tends to resettle in large coastal urban centers with few exceptions, such as Chicago and the Twin Cities area in the United States.⁷

Certain subgroups of refugees and asylum seekers have a higher risk of suffering torture and its psychological sequelae. Barker estimates that between 5–35% of all refugees have suffered torture in their countries of origin.⁸ Although women and minors compromise more than two-thirds of the refugee population, the likelihood of becoming a victim of torture is similar for both women and men.^{6,9,10} Women, nonetheless, are more likely to suffer sexual torture than men.¹¹ Table 1 summarizes the risk factors for torture and its psychological sequelae.^{12,13}

Compared to other immigrant groups, refugees and asylum seekers have higher morbidity and mortality rates. Prevalent illnesses include conditions such as hepatitis B, tuberculosis, intestinal parasites, posttraumatic stress disorder (PTSD), depression, and anxiety.^{14–16} The prevalence of some of these conditions is even higher in tortured refugees than in non-tortured refugees. For instance, the prevalence of PTSD in the general population is around 1%, in non-tortured refugees who experienced battlefield conditions is 20% and in tortured refugees is as high as 67%.^{17,18} Leading causes of death include malnutrition and infectious diseases, such as gastroenteritis.^{14–16}

General practitioners and specialized physicians are likely to encounter refugees and asylum seekers as patients. Two different surveys found that 5–10% of all foreign-born patients seen in general medical settings had suffered torture in their country of origin. Unfortunately, few providers are familiar with the health problems refugees and survivors of torture may suffer.^{19–22} Lack of awareness and training are likely to affect such patients in a direct way. Physicians may misdiagnose certain conditions, particularly those with culture-related symptoms, thus failing to treat properly. More important is the fact that physicians who lack training or awareness may re-traumatize a survivor of torture during a clinical encounter.²³

Table 1*Risk factors for torture**

- 1 Refugee status
- 2 Leader of an opposition organization
- 3 Being a relative of someone who suffered torture
- 4 History of arrest or detention
- 5 Individuals residing in flash point countries
- 6 Prisoners of war
- 7 Immigrants from countries with totalitarian or military regimes
- 8 Members of minority groups
- 9 Civil war in country of origin

*Adapted from Weinstein HM, Dansky L, Iacopino V¹²

Risk factors for psychological sequelae (8)

- 1 Women
- 2 Length and conditions of imprisonment
- 3 Previous psychological trauma
- 4 Mental preparedness
- 5 Level of education
- 6 History of torture
- 7 Age

Classification and forms of torture

For a perpetrator, torture serves two goals. The first objective is to break down an individual physically and mentally. The second objective is to spread fear throughout the community in which the individual resides.²⁴ An implicit aim of those who carry out such acts is to avoid leaving permanent physical marks or to make them as subtle as possible.²⁵ Several techniques exist to minimize the appearance of permanent physical sequelae, for instance, using blunt instruments or protecting the skin with clothing during beatings.²⁴ Perpetrators also inflict the physical torture during the initial stages of the detention, allowing time for ecchymosis, soft tissue edema and other transient physical findings to fade away.

Torture can be classified as physical, mental and sexual. However, it is important to highlight that such classification is an artificial one and only serves the purpose of explaining the nature and extent of torture. In most cases, victims experience all three forms of torture during a single event. Table 2 summarizes some of the most common forms of torture.^{26–34}

Torture affects both central and peripheral nervous systems. Blunt trauma, in particular beatings, is the most common form of physical torture.^{27,29,30,35–37} Beatings and crushing injuries may produce intracranial bleeding, spinal cord hematomas, intracranial edema, cerebrospinal fluid fistulas and seizures. Reports of adult shaken syndrome from violent shaking exist in the literature, allegedly causing retinal and subdural hemorrhages and diffuse axonal injury.^{38,39} Bone fractures caused by blunt trauma may affect some peripheral nerves, such as the axillary and the radial nerves with humeral fractures. Figure 1 shows a spinal cord injury with syrinx formation at the

level of T12–L1 after a wedged compression fracture of L1 vertebral body caused narrowing of the spinal canal. The patient was thrown out of a moving car after being chased by a rival ethnic militia. The neurological exam of the lower limbs revealed asymmetric motor weakness, affecting primarily the hip flexors and the ankle plantar flexors, and an increased Achilles tendon reflex.

Although less common than blunt trauma, penetrating injuries are particularly serious, as they tend to produce more permanent neurological damage. Gun shot wounds to the head or to the spinal cord may produce massive destruction of nerve tissue, leaving patients with a multiple array of conditions such as motor and sensory deficits, as well as cognitive and visual impairments.⁴⁰ Stab wounds may sever peripheral nerves or the spinal cord. Figures 2 and 3 show a lateral view and an anteroposterior view of a skull film and a head CT scan of a political activist who received several gunshots to the head. The neurological exam revealed a mild right arm weakness, particularly on wrist extension, difficulties on fine finger movement, and a bitemporal hemianopia. Figure 4 shows a spinal cord injury at the level of T12–L1. The patient, an opposition activist, received two gunshot wounds in the abdomen, and after falling down he received a third gunshot to the back that severed his spinal cord. On physical exam, complete motor and sensory deficits were present below T11, as well as muscle atrophy and sphincter dysfunction. Figure 5 shows a right humeral fracture caused by a gunshot wound. The patient, a member of an ethnic minority, received the wound during a failed execution attempt, after which he has been experiencing a discrete right wrist extension weakness suggesting a radial nerve injury.

Table 2 Common forms of torture

1	<i>Physical</i> Blunt trauma: beatings, concussive waves of explosions Penetrating injuries: stab wounds, gunshot wounds, and flying shrapnel from explosions Burns: thermal, electrical and chemical Asphyxiation: dry (face covered with a plastic bag or forced to breath chemicals or gases), wet (face submerged in fluid), and hanging Prolonged suspension and prolonged restrain
2	<i>Psychological</i> Threats Mock executions Sensory deprivation: sleep, light Sensory overstimulation: exposure to noises and lights Solitary confinement
3	<i>Sexual</i> Sexual humiliation: forced to stay nude, scolding comments about sexual organs Direct trauma to the genitalia: beatings, stab wounds, burns, suspension Rape

Of the different forms of torture, asphyxiation has the potential for always ending with the death of the

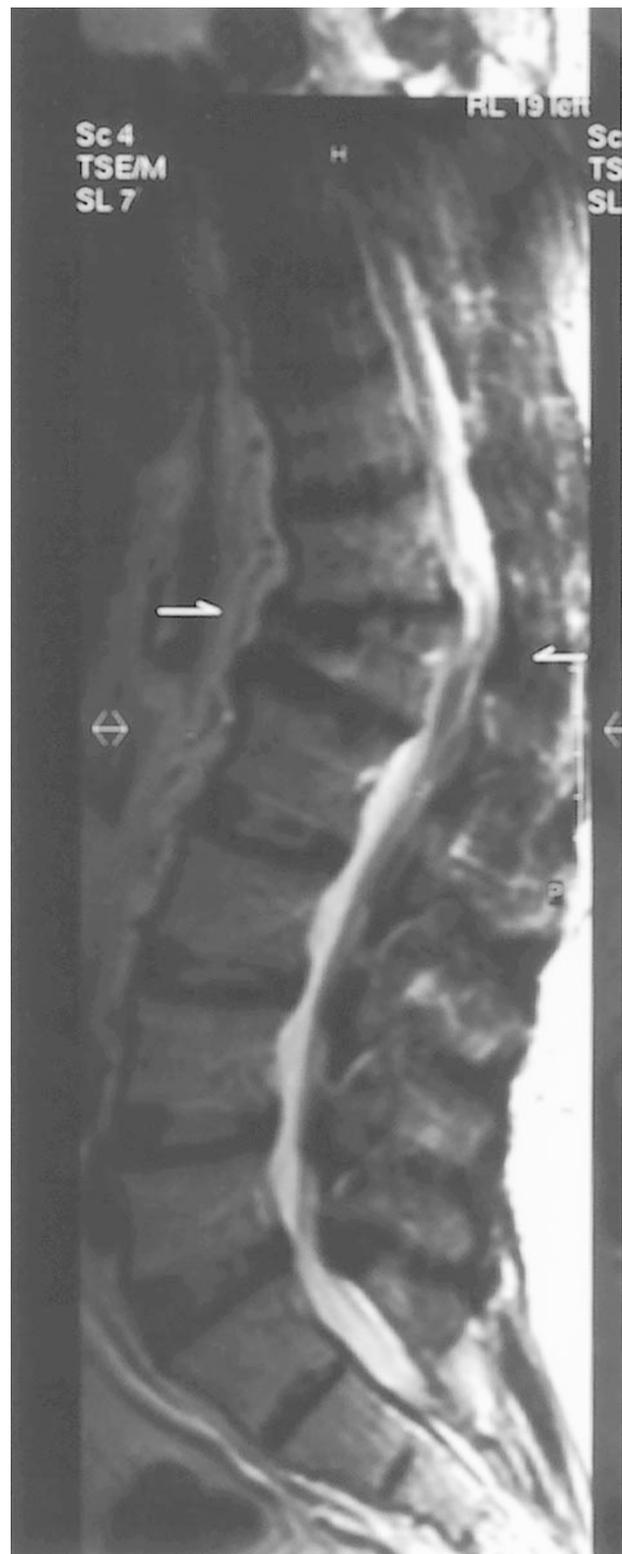


Figure 1 Spinal cord injury at the L1 level, arrows pointing to the syringa formation and to the L1 wedged compression fracture

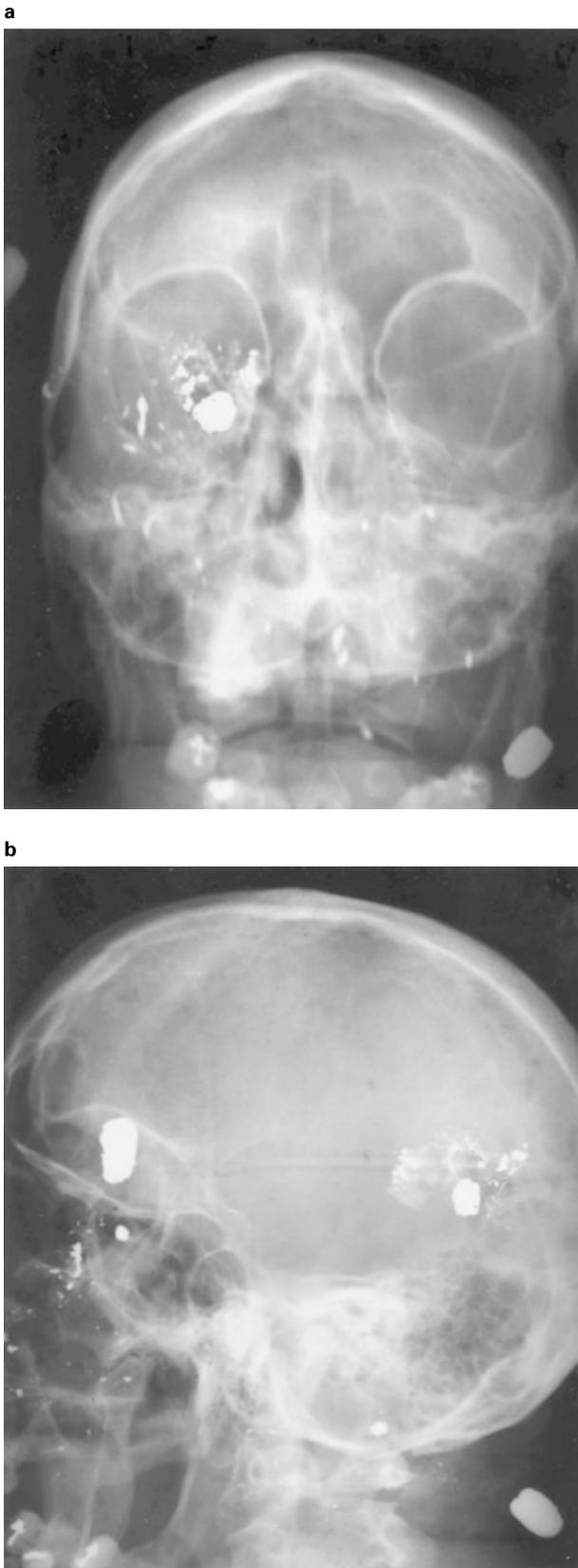


Figure 2 Lateral and anteroposterior views of a skull film showing multiple radiopaque objects consistent with bullets

victim. Regardless if it is carried out by preventing the victim from breathing by covering his or her face with a plastic bag, by submerging the victim's face in fluid, or by hanging the victim, perpetrators can easily go beyond the physical limits that a victim can tolerate without air. When suffocation is not fatal but the extent of the cerebral anoxia is severe, the victim may suffer loss of consciousness, seizures and incontinence. Chronically, victims may suffer from memory and cognitive impairments, or they may be left in a permanent vegetative state.⁴¹ Figure 6 shows a prisoner of war in a Nazi concentration camp during World War II who was asphyxiated during a high altitude experiment.

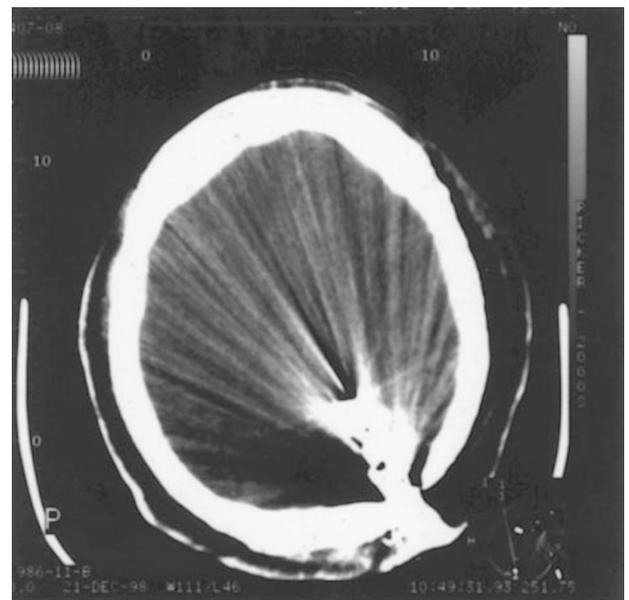


Figure 3 Head CT scan showing a skull fracture and metallic artifact from a bullet

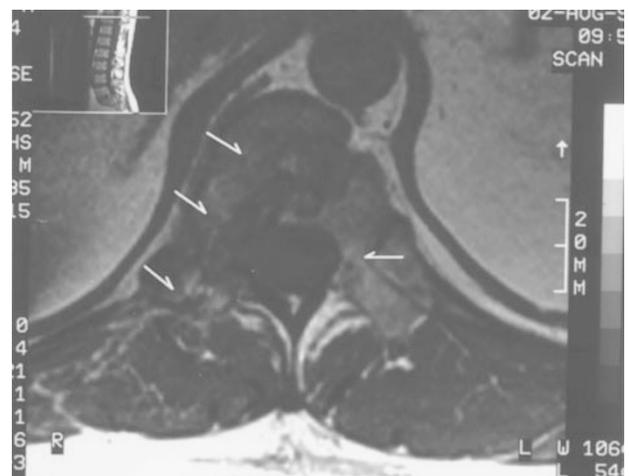


Figure 4 Lumbar spine MRI at T11 level, arrows pointing to the path left by a projectile and to an empty spinal canal

Several different devices may be used to deliver electric shocks during torture, including stunt guns, cattle prods, generators, and wires plugged directly to power outlets.^{39,42} In addition to burns, electric shocks may cause radiculopathies as a result of vertebral compression fractures that arise from violent muscle contractions, lethal cardiac arrhythmias from the disruption of the heart's electrical impulse, incontinence and tonic-clonic seizures.^{29,39,42}

Victims of torture frequently report being restrained with handcuffs, shackles, wires or ropes. A significant number of them also reports being secluded inside small box-type cells that completely limit any physical mobility.³⁵ Tight ropes, handcuffs and shackles may cause peripheral nerve damage with symptoms ranging from transient sensory deficits to permanent motor damage.³⁷ Nerves that are particularly susceptible to compression include, but are not limited to, the median, the ulnar nerves



Figure 5 Diaphyseal fracture of the right humerus due to a gunshot wound



Figure 6 Prisoner of war in a Nazi concentration camp asphyxiated during a high altitude experiment (*Courtesy of the US Holocaust Museum*)

and the tibial nerve. Radial nerve compression may also result from prolonged immobilization, as when victims of torture are forced to lay down on their side inside small box-type cells while having their hands tied on the back. Figure 7 shows the left ankle of a patient who was imprisoned and restrained with a shackle for months because of her ethnic background. The patient reported having dysesthesias on her left sole for some time. During her medical evaluation, the patient was symptom free and her neurological exam was negative.

Suspension causes nerve damage by one of two mechanisms. The first mechanism is direct mechanical compression of the nerve, which may occur when a victim is suspended by the wrists or by the ankles causing damage to either the median, the ulnar or the tibial nerve.³⁹ The second mechanism of injury is axonal damage from forced traction.³⁹ This mechanism occurs quite often when victims are suspended in a 'Palestinian fashion', as shown in Figure 8, causing damage to the brachial plexus. Figure 9 shows a victim of torture with brachial plexus damage as demonstrated by the finding of a wing scapula.

Neurological sequelae of torture

The presence of neurological symptoms, physical findings, and diagnoses varies from study to study. There are three reasons that explain this discrepancy. Some studies look at the presence of acute neurological symptoms, findings, and diagnoses while others look at presence of the chronic ones.^{43,44} Studies analyze different subgroups of torture victims, a rather heterogeneous population because of its diverse

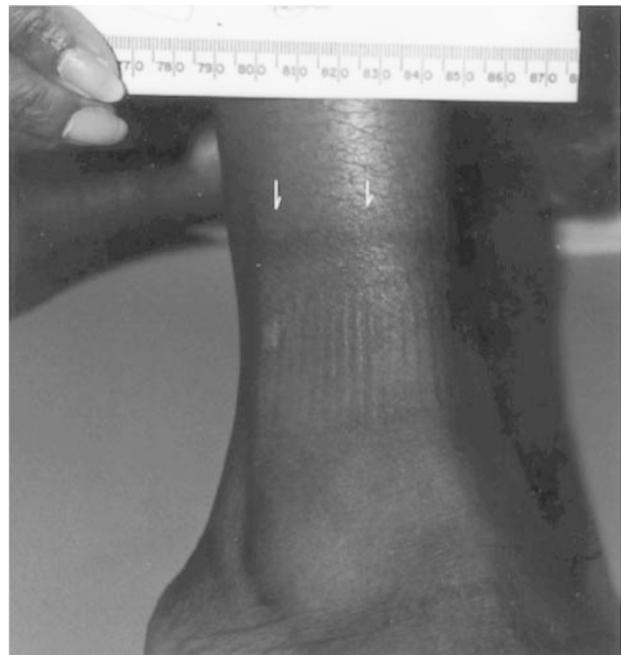


Figure 7 Shackle marks above the left ankle



Figure 8 'Palestinian' suspension and wires to deliver electric shocks (Courtesy of Physicians for Human Rights)

geographical origins, cultural backgrounds and circumstances related to the torture trauma.^{29,44–46} Finally, overlapping symptoms such as headaches, dizziness, numbness and memory impairment are found in both neurological and psychological conditions, making difficult the diagnosis of conditions such as organic brain syndrome.^{30,47}

Neurological symptoms are experienced frequently among survivors of torture. Tables 3 and 4 summarize the neurological symptoms and conditions torture survivors may experience. One study that looked retrospectively at the presence of neurological symptoms found 75% of the patients reported having at least one symptom during torture.²⁹ The same study found that 64% of the patients continued experiencing at least one neurological symptom chronically. In another study, 86% of the patients complained of neurological symptoms during the medical evaluation.⁴⁸

Headache is the most common neurological symptom reported by survivors of torture. In one survey conducted on detained political prisoners, 86% of the patients reported the presence of



Figure 9 Wing scapula on a patient with brachial plexus injury (Courtesy of Physicians for Human Rights)

headaches.⁴³ In another study, 54% of the patients recalled experiencing headaches during torture, and 64% of them complained about this symptom at the time of the interview.²⁹ Mollica *et al*⁴⁵ found in a study on functional health status of Cambodians living in refugee camps that 74% of study subjects reported having frequent headaches.

Other common neurological symptoms include vertigo, loss of consciousness and dizziness. The presence of vertigo ranges from 20% during torture to 3% during the medical evaluation.^{29,49} Loss of consciousness due to head trauma occurred in 19% of the cases and was due to reasons other than head trauma in 31%.²⁹ Two other studies reported loss of consciousness due to beatings in 34% and 90% of the patients.^{50,51} Dizziness is found in up to 68% of torture victims.⁴⁵

Most of the above neurological symptoms are present in victims who suffered head trauma. Overall, the incidence of head trauma during torture is high.^{30,39} Rasmussen reported that 73% of the study subjects endured beatings to the head. Another study conducted on prisoners of war in Croatia found 67% of the patients recalled experiencing blows to the head.⁵² A significant clinical correlation exists between closed head trauma and headaches, as well as between loss of consciousness due to head trauma and changes in visual evoked potentials.^{29,53}

Less frequent neurological symptoms include paresthesias, paralysis of a limb, and seizures. Patients describe paresthesias more often in the upper limbs than in the lower. Overall, about 10% of torture victims reported such symptom.²⁹ Paralysis of a limb was reported in less than 2% of the patients.⁴⁵ The presence of seizures in torture victims, which is strongly related to electric shocks, ranges from 2.5% to 8%.^{29,43,45}

Table 3 Clinical symptoms

<i>Form of torture</i>		<i>Acute</i>	<i>Chronic</i>	
<i>Central Nervous System</i>	<i>Asphyxiation</i>	Dry	Loss of consciousness	Cognitive impairment
		Wet	Incontinence	Memory deficits
		Hanging	Seizures	Vegetative states
	<i>Blunt Trauma</i>	Crushing injuries	Headaches	Headaches
		Beatings	Loss of consciousness	Memory deficits
			Memory deficits	Seizures
			Seizures	Vertigo
			Vertigo	
	<i>Electric shocks</i>		Dysesthesias	Chronic pain syndrome
			Involuntary spasm	Dysesthesias
		Loss of consciousness	Seizures	
<i>Penetrating Injuries</i>	Gunshot wounds	Loss of consciousness	Sensory deficits	
	Stab wounds	Motor deficits: weakness/paralysis	Motor deficits	
		Sensory deficits: hypoesthesia/anesthesia		
<i>Peripheral Nervous System</i>	<i>Blunt Trauma</i>	Crushing injuries	Motor deficits: weakness/paralysis	Motor deficits: weakness/paralysis
		Beatings	Pain	Pain
			Sensory deficits: hypoesthesia/anesthesia	Sensory deficits: hypoesthesia/anesthesia
	<i>Penetrating Injuries</i>	Gunshot wounds	Motor deficits: weakness/paralysis	Motor deficits: weakness/paralysis
		Stab wounds	Pain	Pain
			Sensory deficits: hypoesthesia/anesthesia	Sensory deficits: hypoesthesia/anesthesia
	<i>Prolonged restrain and suspension</i>		Dysesthesias	Dysesthesias
			Motor deficits: weakness/paralysis	Motor deficits: weakness/paralysis
			Pain	Pain
		Sensory deficits: hypoesthesia/anesthesia	Sensory deficits: hypoesthesia/anesthesia	

Data about the presence or absence of neurological finding on physical examination is limited. A United States Navy study found that former prisoners of war were eight times more likely than non-prisoners of war to have clinical and/or laboratory findings consistent with peripheral nervous system disorders that fell within the International Classification of Diseases (ICD) codes 350 to 359, such as mononeuritis of the upper limb and mononeuritis multiplex.⁴⁴ Rasmussen found that around 16% of the torture victims had abnormal neurological findings, of which decreased sensation was the most common one.²⁹ In another study, 22% of the torture victims were found to have abnormal neurological findings on physical examina-

tion.⁴⁸ In our experience at the Boston Center for Refugee Health and Human Rights, around 8% of the patients presented neurological findings on physical examination (Moreno A, Piwowarczyk L, and Grodin MA. unpublished data). Similar to Rasmussen's study, the most frequent neurological finding at the Boston Center for Refugee Health and Human Rights is sensory deficits.

Clinical approach to the survivor of torture with neurological sequelae

The basic steps towards a successful and meaningful clinical interaction with a survivor of torture include

Table 4 Neurological conditions

<i>Form of torture</i>		<i>Acute</i>	<i>Chronic</i>	
<i>Central Nervous System</i>	<i>Asphyxiation</i>	Dry	Cerebral anoxia	Cerebral anoxia
		Wet	Epilepsy	Epilepsy
		Hanging		
	<i>Blunt Trauma</i>	Crushing injuries	Concussion syndrome	Epilepsy
			Epilepsy	Organic brain syndrome
		Beatings	Intracranial bleeding	Shaken adult syndrome
			Spinal cord injury: paraplegia/quadriplegia	Spinal cord injury: paraplegia/quadriplegia
		<i>Electric shocks</i>	Epilepsy	Epilepsy Chronic pain syndrome
	<i>Penetrating Injuries</i>	Gunshot wounds	Increased intracranial pressure	Hydrocephalus
		Stab wounds	Intracranial bleeding	Spinal cord injury: paraplegia/quadriplegia
		Spinal cord injury: paraplegia/quadriplegia		
<i>Peripheral Nervous System</i>	<i>Blunt Trauma</i>	Crushing injuries	Peripheral neuropathies: sensory and motor	Peripheral neuropathies: sensory and motor
		Beatings		Reflex sympathetic dystrophy
	<i>Penetrating Injuries</i>	Gunshot wounds	Motor deficits: weakness/paralysis	Motor deficits: weakness/paralysis
		Stab wounds	Sensory deficits: hypoesthesia/anesthesia	Sensory deficits: hypoesthesia/anesthesia
	<i>Prolonged restrain and suspension</i>		Compression and entrapment neuropathies	Chronic pain syndrome
		Brachial plexus injury	Compression and entrapment neuropathies Brachial plexus injury	

avoiding retraumatization, building trust, spelling out any limits on confidentiality, and above any other, establishing empathy with the patient. For most victims, torture is a shameful event that patients believe needs to be kept away from relatives and friends. Physicians often become the first person to whom the survivor confides his or her story. Physicians are in a key position to reopen bridges of trust between the patient and the community, which are essential for successful social reintegration.

Physicians should pay special attention to retraumatization, which may happen inadvertently, may affect relatives of the patient if they are present during the interview and the examination, or may affect the providers themselves, including the physicians.^{54,55} To avoid victim retraumatization, it is important to consider the following guidelines.^{12,31,55} Before seeing a survivor of torture, a physician should, if possible,

learn about the patient's country conditions. Such preparation helps the physician not only to better understand the patient's problem, particularly the trauma history, and to avoid cultural misunderstandings, but also to show a genuine interest for the patient. The exam room where the medical interview takes place should not resemble a prison cell, should be free of curtains or folding screens and should have a comfortable room temperature.^{12,31,55}

The physician should introduce him or herself and explain the purpose of the visit, whether it is for consultation, to establish regular care, or to conduct an asylum evaluation.^{12,31,55} The physician should give the patient a sense of control.¹² For instance, the physician should allow the patient to terminate the interview or to stop the examination at any time. Rushing the patient or asking serial questions must be avoided since it resembles an interrogatory.

One of the most common mistakes physicians make with survivors of torture, thus a source for retraumatization, is failing to explain the interview, the examination or any diagnostic test that would be performed.^{12,55} For instance, pulling out a reflex hammer and tapping the victim without fully explaining the purpose of this action may trigger a flashback of past beatings. Similarly, an MRI scanner may resemble a box-type cell because of its tight space. The electrodes of an electroencephalogram machine may resemble the devices used to deliver electric shocks.

Not all survivors of torture are ready to reveal their trauma history during the first visit; nor it is necessary to do so. Physicians should remember that, in addition to building trust, patients sometimes need to come to terms with personal conflicts before being able to tell their story. Sometimes such conflicts include an inherent fear to physicians either because they are seen as government agents or because they were active or passive participants of the torture.^{43,56,57} Meanwhile, the most important thing a physician can do is to continue to show to the patient his or her support.

When interpreters are present, physicians should remember possible drawbacks.^{12,31,55,58} If the interpreter is a relative, the patient may not fully disclose the trauma for fear of hurting his or her relative, or the relative may not provide an accurate translation because he or she is ashamed of the actual trauma history. When the interpreter is a fellow national, issues of confidentiality become a problem. In addition, the patient may not fully trust the interpreter fearing he or she may be a government agent. Professional interpreters can be costly, may not always be available, or may fail to provide an accurate cultural translation. At no time, should children be used as interpreters for their parents or relatives. Even when the child is the patient and he or she speaks the language, physicians must request the presence of an interpreter for the parents.

Providers planning to conduct a written affidavit or consultation report as part of an asylum claim are encouraged to read the Istanbul Protocol in its entirety, which can be found at the website Physicians for Human Rights (www.phrusa.org/research/istanbul_protocol/index.html).

Teamwork is important not only for the success of the victim's treatment, but also to avoid vicarious traumatization. Team members may include nurses, physical therapists, social workers, psychotherapists, vocational therapists, as well as non-health professionals such as attorneys and schoolteachers. Because most victims of torture link with medical care only after a window of opportunity to prevent the appearance of permanent torture sequelae has passed, team efforts should be geared towards making the patient as functional as possible both at a physical and a psychological level. Permanent physical sequelae are a constant reminder of the trauma and a source for psychological distress.²⁵

Conclusion

Neurological sequelae of torture can be devastating physically and psychologically. Victims of torture can be left with painful and permanent disabilities, such as chronic pain syndromes, organic brain syndrome, paraplegia, just to mention few of them. The treatment of these neurological conditions does not differ from other patient populations. However, the clinical approach is unique in order to avoid retraumatization and to help the victim reintegrate into society as quickly as possible.

As the number of survivors of torture continue to increase, physicians are more likely to encounter such patients in their clinical practices. Therefore, physicians should be alert when they care for foreign-born patients. Asking about torture should be part of the interview when caring for such patients and fears of addressing this subject should be set aside. If the physician fears not knowing what to do after asking the question of torture, several non-governmental organizations are ready to help. At Global Lawyers and Physicians (www.glphr.org), a worldwide directory of such organizations is available to anyone.

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