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Effect of burns on speech

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ABSTRACT

Abstract (English)

Burns are the lesions produced usually by heat. The incidence of fatal burns in different autopsy series varies from 6% - 23%. In our country the incidence are quite high among young individual specially the females due to various social factors. The dying declaration given by the victims of burns is usually the key evidence in the court of law. Medical officers and autopsy surgeons are invariably asked to give opinion about the ability to speech of the deceased suffering from burns, effect of painkiller etc. A pilot study on 21 cases of burns in a tertiary care teaching medical institution of east Delhi was conducted to answer these important questions about burns and dying declaration showed that the extent of burns as well as pain killer medicines do not have significant effect on speech of the patient. Usually the speech and orientation is maintained. However, electrical burns and alcohol consumption affect the orientation and speech. Females can tolerate burns better than males.

Abstract (German, Deutsch)

Brände sind die Verletzungen, die normalerweise durch Hitze produziert. Die Ausdehnung der tödlichen Brände in den unterschiedlichen Autopsieserien schwankt von 6% - 23%. In unserem Land sind die Ausdehnung unter junger Einzelperson besonders die Frauen wegen der verschiedenen Sozialfaktoren ziemlich hoch. Die Sterbenerklärung, die von den Opfern der Brände abgegeben, ist normalerweise der Schlüsselbeweis im Gericht. Medizinische Offiziere und Autopsiechirurgen gebeten unveränderlich, Urteil über die Fähigkeit zur Rede des gestorbenen Suffering von den Bränden, vom Effekt von painkiller usw. abzugeben. Eine Versuchsuntersuchung über 21 Kästen der Brände in einer tertiären Obacht, die medizinische Anstalt von Ostdelhi unterrichtet, geleitet, um diese wichtigen Fragen über Brände zu beantworten und Sterbenerklärung zeigte daß der Umfang der Brände, sowie

Schmerzmördermedizin haben Sie bedeutenden Effekt nicht auf Rede des Patienten. Normalerweise beibehalten die Rede und die Lagebestimmung en. Jedoch beeinflussen elektrische Brände und Spiritusverbrauch die Lagebestimmung und die Rede. Frauen können Brände zulassen besser als Männer.

Abstract (French, Française)

Les brûlures sont les lésions produites habituellement par la chaleur. L'incidence des brûlures mortelles dans différentes séries d'autopsie change de 6% - 23%. Dans notre pays l'incidence sont tout à fait haute parmi le jeune individu particulièrement les femelles dues à de divers facteurs sociaux. La déclaration de mort donnée par les victimes des brûlures est habituellement l'évidence principale dans la cour de la loi. Des officiers médicaux et les chirurgiens d'autopsie sont invariablement invités à donner l'opinion au sujet des capacités au discours de la douleur décédée des brûlures, de l'effet du painkiller etc... Une étude préliminaire sur 21 caisses de brûlures dans un soin tertiaire enseignant l'établissement médical de Delhi est a été conduite pour répondre à ces questions importantes au sujet des brûlures et la déclaration de mort a prouvé que l'ampleur des brûlures comme des médecines de tueur de douleur n'ayez pas l'effet significatif sur le discours du patient. Habituellement le discours et l'orientation est mis à jour. Cependant, les brûlures et la consommation électriques d'alcool affectent l'orientation et le discours. Les femelles peuvent tolérer des brûlures mieux que des mâles.

Abstract (Italian)

Le ustioni sono le lesioni prodotte solitamente da calore. L' incidenza delle ustioni mortali in serie differente di analisi varia da 6% - 23%. Nel nostro paese l' incidenza è specialmente abbastanza alta fra l' individuo giovane le femmine dovuto i vari fattori sociali. La dichiarazione morire data dalle vittime delle ustioni è solitamente la prova chiave nella corte di legge. Gli ufficiali sanitari ed i chirurghi di analisi sono chiesti invariabilmente di esprimere il parere circa l' abilità a discorso del suffering defunto dalle ustioni, dall' effetto di painkiller ecc. Uno studio pilota su 21 cassa delle ustioni in una cura terziaria che insegna l' istituzione medica di Delhi orientale è stato condotto per rispondere a queste domande importanti circa le ustioni e la dichiarazione morire ha indicato che il limite delle ustioni come pure le medicine dell' assassino di dolore non avere effetto significativo su discorso del paziente. Solitamente il discorso e l' orientamento è effettuato. Tuttavia, le ustioni ed il consumo elettrici dell' alcool interessano l' orientamento ed il discorso. Le femmine possono tollerare le ustioni più meglio dei maschi.

Abstract (Portuguese, Português)

As queimaduras são os lesions produzidos geralmente pelo calor. A incidência de queimaduras fatais em séries diferentes da autópsia varia de 6% - 23%. Em nosso país a incidência é completamente elevada entre o indivíduo novo especialmente as fêmeas devido aos vários fatores sociais. A declaração morrer dada pelas vítimas das queimaduras é geralmente a evidência chave na corte de lei. Os oficiais médicos e os cirurgiões da autópsia são pedidos invariàvel para dar a opinião sobre a abilidade ao discurso do sofrimento falecido das queimaduras, do efeito do painkiller etc.. Um estudo piloto em 21 caixas das queimaduras em um cuidado tertiary que ensina a instituição médica de Deli do leste foi conduzido para responder a estas perguntas importantes sobre queimaduras e a declaração morrer mostrou que a extensão das queimaduras assim como medicinas do assassino da

dor não tenha o efeito significativo no discurso do paciente. Geralmente o discurso e a orientação são mantidos. Entretanto, as queimaduras e o consumo elétricos do álcool afetam a orientação e o discurso. As fêmeas podem tolerar queimaduras mais melhor do que machos.

Abstract (Spanish, Español)

Las quemaduras son las lesiones producidas generalmente por el calor. La incidencia de quemaduras fatales en diversas series de la autopsia varía de 6% - 23%. En nuestro país la incidencia es absolutamente alta entre individuo joven especialmente las hembras debido a los varios factores sociales. El declaración el morir dado por las víctimas de quemaduras es generalmente la evidencia dominante en la corte de la ley. Piden los médicos castrenses y los cirujanos de la autopsia invariable dar la opinión sobre la capacidad al discurso del sufrimiento difunto de quemaduras, del efecto del painkiller etc. Un estudio experimental en 21 cajas de quemaduras en un cuidado terciario que enseñaba a la institución médica de Delhi del este fue conducido para contestar a estas preguntas importantes sobre quemaduras y el declaración el morir mostró que el fragmento de quemaduras tan bien como medicinas del asesino del dolor no tenga efecto significativo en el discurso del paciente. Generalmente se mantiene el discurso y la orientación. Sin embargo, las quemaduras y la consumición eléctricas del alcohol afectan la orientación y el discurso. Las hembras pueden tolerar quemaduras mejor que varones.

Keywords: Burns; Dying declaration; Speech

Introduction

Burns are the pathological lesions produced by application of heat, although electricity, radiations, chemicals and other energy sources also produce somewhat similar lesions. Commonly, the term burns refers to dry heat or flame burns. The last several years have shown steadily high figures pertaining to cases of burns. The number of studies conducted all over the country shows the incidence of fatal burns from 6% to 23% among autopsy series (1-3). Female death far outnumbers male death in these studies with male, female ratio varying from 1:1.5 to 1:3. India is peculiar in the sense that the number of young married female dying of burns is probably the highest in the world because of the so called "Dowry death" or "Bride Burning". The concept of dowry was in existence in our society from ancient time but has taken the shape of a social evil with the modernization of society in which the money is playing a major role. The source of easy money has been found in the bride in the form of extraction of dowry. The Government of India promulgated the "Dowry Prohibition Act" in 1961 to control this menace. When the number of dowry related deaths increased in 1980's, the government was forced to amend the criminal law as per the Criminal (2nd amendment) Act, 1983 which brought about changes in Indian Penal Code, Criminal Procedure Code and Indian Evidence Act to deal more effectively with cases of dowry death and also cases of cruelty to married women by in laws.

Most often there is hardly any witness to the crime of bride burning as it often occurs in the house of her in laws and dying declaration / statement to the magistrate /police/doctor is the key piece of evidence for the prosecution to establish his case. The autopsy surgeon and/or casualty medical officer is invariably asked, in the cross examination while deposing his evidence before the court, whether a patient of burn is able to give his statement or in other words is able to speak due to shock and other factors. None of the standard textbook on emergency care/forensic medicine clarifies this issue and the doctor has to give opinion based on his/her personal experience that can

be doubted at any time by the court. To investigate this issue a pilot study was conducted in the department of Forensic Medicine and casualty of a tertiary care teaching institution of east Delhi during the year 1999.

MATERIALS & METHODS

The material for the present study comprised of 21 cases of burns brought for the treatment at the casualty of a tertiary case teaching medical institution during the year 1999. A Proforma was designed and was filled by the duty casualty medical officer whenever a case of burn reported to the casualty. The cases were selected randomly but keeping in view that statements by the patients are usually given within the first 6 hours of burns, only those cases were selected in which the duration of burns was less than 6 hours. Burns having a longer duration were excluded from the study. The duly filled Proformas were analyzed in detail. The following conclusions were arrived at.

OBSERVATIONS AND RESULTS

Age and Sex Distribution

The age of the victims in the study varies from 14 years to 56 years of age. More than sixty percent (61.9%) patients were in the younger age group of 11-30 yrs. In this group out of the total 13 cases, 8 were female and 5 were male. No female victim belonged to more than 40 yrs of age. The over all male female ratio was almost similar (Table 1)

Table 1. Age and Sex distribution

Age group	*No. of cases*		*Total*
	Male	Female	
11 - 20	2	4	**6 (28.6)**
21 - 30	3	4	**7 (33.3)**
31 - 40	1	2	**3 (14.3)**
41 - 50	4	0	**4 (19.0)**
51 - 60	1	-	**1 (04.8)**
Total	**11 (52.4%)**	**10 (47.6)**	**21 (100%)**

2. Cause and nature of burns

Ninety five percent of cases were reported accidental by the victims, while 5 percent were suicidal. No case of homicidal burning was seen in the present series. The causative agent for burn was flame (fire) in 95.2% cases and electrical burns were seen in 4.8% cases (Table 2).

Table 2. Cause and nature of burns

S. No.	*Nature of burns*	*No. (%)*	*Flame*	*Electrical*	*Others*
1	Accidental	20 (95.2)	18	2	**0**
2	Suicidal	1 (04.8)	1	0	**0**
3	Homicidal	0	0	0	**0**
	Total	**21 (100)**	**19 (90.5)**	**2 (09.5)**	**0**

3. Total Body Surface Area involved and orientation

The cases were divided into 4 groups depending upon the total body surface area (TBSA) involved group 1 (upto 25%), group 2 (26-50%), group 3 (51-75%) and group 4 (more than 75%). The number of cases among different groups varied from 3-7 (14.3% - 33.3%). Looking at the effect of Total Body Surface Area involved, the orientation of the patients was altered significantly only in 1/3rd cases and rest 2/3rd cases elicited normal orientation to time, place and person. No correlation could be established between the orientation of the patient vis a vis Total Body Surface Area involved.

4. Effect on speech vis-à-vis involvement of face & lips and medication

Face and lips involvement by burns is seen in 12 (57.1%) cases. Out of these 12 cases, 7 cases were not having speech clarity as well as their orientation was also altered. While in 5 cases, there was no effect on speech in spite of involvement of face and lips.

Table 3. Effect on speech and involvement of face and lips

Group of TBSA	*No. of cases*	*Face & Lips*	*Speech affected*
1	4	1	**1 (Electrical Burn)**
2	7	2	**0**
3	3	2	**2 (Both consumed alcohol)**
4	7	7	**4 (one patient consumed alcohol)**
Total	**21 (100)**	**12 (57.1)**	**7 (33.3)**

The one case in group 1 (0-25% of Total Body Surface Area) was a case of electrical burn and both the cases in group 3 (51-75%) has consumed alcohol. Out of the total 7 cases found with defective speech and altered orientation 3 has consumed alcohol. Further, in this group 6 were male and only one was female. In all the cases a pain killer in the form of injection diclofenac was already given before the examination was conducted. A subsequent examination conducted about half an hour did not show significant change in the orientation and speech clarity except in one case, who was a 14 yrs female with grade IV, accidental flame burns.

However, opinion on the effect of strong hypnotic/sedative on speech could not be commented as they were not administrated in these cases prior to examination.

DISCUSSION

One of the most important difference between human beings and lower animals is the facility with which human beings can communicate with each other (1). Speech, reading and writing are

elaborate forms of communication (4). The Left cerebral hemisphere's cortex is usually responsible for speech even in a Left handed person with dominant Right hemisphere (5). Aphasia is the term applied to disorders of expression in speech, writing and sign language, and use symbols as well as to disabilities in comprehension of spoken, written and signed language. Lesions causing aphasia are usually in the cerebral cortex and typically are found in cortical "association" areas. There are 4 critical areas in the left hemisphere in relation to speech production and linguistic thinking:

(a) Broca's area - lower prefrontal cortex, Brodmann's area 44;

(b) Upper frontal cortex on the mesial surface of the left hemisphere;

(c) Parietal cortex, posterior to the lower part of the postcentral gyrus; and (d) Temporal lobe cortex posteriorly (Wernicke's area)

Any damage to these areas may cause aphasia such as brain injury, surgery or other damage to the cerebral cortex (6). According to Head, there are 4 types of aphasia namely: a) verbal aphasia (loss of power to express ideas in words); b) jargon dysphasia (showing, syntactical deficiencies, speaking jargon, grammatically); c) naming defects (unable to name objects or express meaning, confused evaluation of coins); and d) sematic defects (little difficulty in speech and naming but does not comprehend the meaning of speech (7).

There are few other disabilities of speech and perception like:

dysarthria (loss or difficulty of expression with internal speech and psychical aspect of speech impairment) agnosia (word blindness or word deafness, failure to interpret sensory impressions) agraphia (inability/difficulty in writing language) astereognosis (loss of ability to recognize objects placed in hand, or letters or numbers drawn on skin) apraxia (unable to act purposefully at will, in absence of paralysis)(4).

The disturbances of fluency, verbal comprehension, repetition and writing are all prominent in left anterior temporal lobe lesions (amnestic or Wernicke's aphasia). Left frontal lesions affect articulation and fluency more than the other categories of language (8). Available clinical evidence indicates that Wernicke's area is essential for the comprehension and recognition of words and language, whereas Broca's area is needed for mechanical production of speech (6).

Going through the above discussion it is clear that ability to speak is entirely dependent upon the functioning of brain and long as brain in functioning, the speech is intact. So, the extent and part affected by burn did not effect the speech directly. In our study, the electrical burn affected the speech much more as compared to flame burns. The reason could be that in addition to burns, an electrical injury also affects the functioning of brain depending upon the pathway taken by electrical current in the body. Patients who consume alcohol had direct effect on orientation and speech, depending upon the amount consumed. Further, the study reconfirmed that females are in better position to tolerate burns and thus can give a dying declaration since there orientation and speech are well mentioned in spite of large Total Body Surface Area and even with involvement of face and lips. Another point brought forth by this study was that the administration of pain killers do not significantly affect either the speech or orientation.

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