at exposure—that is, corrected—reduced the predictive effect of the equation, though carboxyhaemoglobin concentration on admission was shown to have an additional independent relation with mortality once age and percentage burns were taken into account. Arterial blood gas analysis and abnormalities seen on chest radiography showed no additional relation with mortality.

Discussion

Bull's mortality probability chart is an important prognostic index for comparison of mortalities in burnt patients.³ It does not, however, take injury due to smoke inhalation into account.

This study confirms the apparent discrepancy between our actual and predicted mortality figures based on Bull's chart, which will probably reflect the additional hazard of injury due to smoke inhalation. Stepwise linear logistic regression analysis has been used to identify independent prediction of outcome in other clinical contexts, such as analysis of the risk of death after a portacaval shunt operation,¹² and was highly accurate in predicting mortality in this study. The new equation has the further benefit of allowing mortality probability to be calculated for various victims of fire trauma, including patients with burns alone, those with a combination of smoke and burn injuries, and those suffering from smoke inhalation alone. The mortality probability chart could be used to differentiate patients into general categories such as low, medium, and high risk patients to plan management—for example, elective transfer to intensive care facilities soon after admission. Patients with calculated mortality probabilities of 0.0-0.33, 0.33-0.66, and ≥0.66 would be low, medium, and high risk patients, respectively. All high risk patients should be transferred directly from the accident and emergency department to the respiratory intensive care unit for management.

This study shows that the extent of smoke inhalation may be quantified by either clinical score or carboxyhaemoglobin concentration at exposure. We emphasise that the accuracy of the clinical score depends on the kind of careful collection of data used in this study. From previous experience we conclude that medical staff at all levels find considerable difficulty in managing inhalation injury

owing to uncertainties about relevant clinical findings, arterial blood gas analysis, chest radiography, and the role of blood carboxyhaemoglobin concentration measurement. This is exacerbated by the lack of formal undergraduate and postgraduate teaching on the subject.¹⁴ We therefore suggest incorporating the clinical score plus carboxyhaemoglobin concentration at exposure into the routine surveillance of fire victims attending the accident and emergency unit for assessment.

Finally, the mortality probability equation may be derived with a simple calculator with a log function and should be applied prospectively to data on the patient from other units before validation of their accuracy and discriminative role in identifying the risk of death in victims of fire trauma.

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SHORT REPORTS

Screening for scoliosis: the problem of arm length

The forward bend test is an integral part of the assessment of scoliosis, whether for screening purposes or in the established condition. The introduction of the scoliometer, an inclinometer placed over the area of maximal deformity, has provided a rapid method of quantifying the rib or lumbar hump, and a recommended threshold for further follow up or orthopaedic assessment has been suggested.¹ An increased prevalence of arm length asymmetry exists in adolescent idiopathic scoliosis.² The influence of this recognised variable on forward bend assessment has been ignored in many papers reporting results from scoliosis screening programmes. Some reports recommend that the arms hang freely (position A),³ others that the hands are placed together with fingertips apposed (position B),^{4 5} and in many no accurate description of the position used is given. We examined the effect of different arm positions on scoliometer readings in 113 school-children.

Patients, methods, and results

One hundred and thirteen schoolchildren (41 girls and 72 boys) aged 13 or 14 were examined by two independent observers. Arm lengths (from acromion to tip of middle finger) were measured to the nearest mm. Scoliometer readings of the magnitude and direction of any asymmetry were taken at the level of the spinous processes of the fourth and eighth thoracic vertebrae in positions A and B (described above) and also with the fingertips of the left hand apposed to the proximal finger crease of the right hand (position C) and vice versa (position D).

Both observers showed the right arm to be longer than the left in the group overall and in girls. In boys, however, the right arm was longer when recorded by one observer and the left when recorded by the other (see table). The maximum difference observed in arm length was 24 mm.

Mean (SEM) scoliometer readings (in scoliometer degrees). Positive values indicate a left sided rib hump, negative values a right sided rib hump

Position	Thoracic vertebrae	Girls	Boys
A	T4	-0.27 (0.27)	-0.42 (0.16)
	T8	0.00 (0.32)	-0.06 (0.18)
B	T4	-0.28 (0.26)	-0.45 (0.17)
	T8	-0.17 (0.34)	0.02 (0.17)
C	T4	-5.60 (0.28)	-6.10 (0.25)
	T8	-3.06 (0.31)	-2.99 (0.22)
D	T4	5.28 (0.30)	5.40 (0.23)
	T8	2.88 (0.33)	3.08 (0.20)

There was a highly significant correlation in the scoliometer readings recorded by the two observers in all positions ($p<0.0001$), and thus mean scoliometer readings were subsequently used. The table gives the mean scoliometer reading in each position. A significant correlation (Pearson product-moment) between the difference in arm length and the change in scoliometer reading between position A and B was found only by one observer, at T8 ($p<0.02$). Positive correlations were found, however, between these two variables for both observers for the whole group and for the girls alone; all but one of the coefficients for the boys were

also positive. When both observers' results are considered at the T4 and T8 levels by sex the overall correlation is significant (sign test; $p < 0.05$). The consistent production of a noticeable rib hump of roughly 6° at T4 on the same side as the "longer" arm in positions C and D was seen clearly. This finding was constant for both observers and it reversed to the opposite side when changing from position C to D. The scoliometer readings at T8 in positions C and D showed a similar hump, but of only 3°. Again this reversed consistently between positions C and D.

Comment

This study shows that true arm length inequality has an important influence on the perceived rib hump when a forward bend position with the hands apposed is used. Furthermore, if the same position is used and an artificial arm length inequality of roughly 5 cm made an apparent and reproducible rib hump of 6° at T4 and 3° at T8 results. Exaggeration of the apparent deformity will be proportional to the magnitude of arm length inequality present, and this may be sufficient to influence the scoliometer reading and push a child over the threshold for referral. The results of screening programmes will accordingly be inaccurate. This influence may be eliminated by adopting a standard position for the forward bend test with the arms hanging freely.

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Rape: the forgotten victim

The plight of rape victims has been given increasing attention over the past decade,¹ but little emphasis has been placed on the reactions of their partners. Over the past year I have interviewed and counselled the partners of rape victims referred to a victim support scheme. A characteristic response by the partners has emerged, and I report one case in detail and summarise seven others (table) to illustrate this.

Reactions of male partners of rape victims

Case No	Age (years)	Marital state	Rapist	Initial reaction	Protective and avoidance activity	Psychiatric symptoms	
						Early (one month)	Late (three months)
1	45	Married	Stranger, convicted	Helplessness	Protected house with locks; unable to travel on business in order to stay with wife; avoided newspapers, television, male friends	Depersonalisation, muscle tension, loss of libido	Guilt: "if only I had done . . ."
2	37	Cohabiting	Stranger, not convicted	Violence to girlfriend	Looked for rapist in street; gave up work to stay with girlfriend; unable to discuss rape	Tension, irritability, increased alcohol intake, loss of libido	Shame, depression
3	30	Cohabiting	Acquaintance, not convicted	Angry at wife and rapist	Put mortise locks on doors; insisted that girlfriend did not answer door; accompanied her to shops; could not sit in living room where rape took place	Tearfulness, anxiety, ideas of reference, increased alcohol intake, initial insomnia, libido increased	Tearfulness, hopelessness
4	58	Married	Acquaintance, convicted	Angry at rapist	Stopped going out; installed intercom system in flat	Worry, headaches, restlessness	Guilt
5	28	Cohabiting	Stranger, convicted	Angry at rapist; wish to wash girlfriend	Fortified home with burglar alarm; accompanied girlfriend on her activities; made regular phone calls and contact times; avoided male friends, television, and newspapers	Tension, destructiveness (eg, punches walls, breaks belongings), loss of libido	Hopelessness, despair over relationship
6	27	Married	Stranger, convicted	Disbelief	Avoided subject of rape; was angry about sexist comments if wife was present	Restlessness, hypochondria, loss of libido	Depression, self-depreciation
7	35	Cohabiting	Stranger, not convicted	Angry at rapist	Decided to move house; carried knife around; became engaged; avoided television programmes	Muscle tension, loss of interest, delayed sleep, loss of libido	Anger, social withdrawal

Case report

A 27 year old man was referred one week after his wife had been raped at knifepoint. His initial reaction had been anger towards his wife, but after 24 hours his anger had been directed towards the rapist and he wanted violent revenge. He began to increase the security of his home (despite the rape having taken place outside), required his wife to telephone him at regular intervals when she was out, and kept a starting pistol by the bed in case of intruders. He avoided reminders of rape by switching off his television or radio if sexual violence was portrayed. These actions were associated with increasing tension, headaches, irritability, and anxiety compounded by poor sleep, reduced appetite, loss of libido, and increased consumption of alcohol and cigarettes.

He was seen individually for weekly counselling sessions. After one month, although his tension, anxiety, and somatic symptoms had diminished, he was more depressed and withdrawn and felt despair and guilt over his failure to prevent the rape; his libido had not returned. He was then interviewed with his wife and encouraged to talk about his difficulties. An attempt was made to clarify misunderstandings, and they were encouraged to talk more frankly with each other about their problems. After three months he no longer required his wife to telephone him regularly, had stopped censoring the television and radio, but still kept the starting pistol by the bed. Sexual intercourse had resumed, although he complained of a sense of inhibition.

Comment

Other reports have recommended that family members should participate in the counselling of rape victims,^{2,3} but I suggest that a characteristic syndrome occurs in the partners. This may be divided into phases: an initial phase of anger, lasting five to seven days, is followed by a protective phase, in which avoidance activity occurs. This is initially accompanied by anxiety, which lasts over a month, but a depressive phase emerges later, associated with guilt and sexual difficulties. As with grief reactions, each phase merges with the next, but a progression is nevertheless clear.

This brief report is intended to make doctors and voluntary bodies aware of the psychological changes that may occur in a victim's partner, as they may not only have severe consequences for the partner but also interfere with the victim's rehabilitation.

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