

teria for developing newer areas of science and technology in the country should be operated on a different level for a fixed period of time. Discrepancies would arise, but this has to be pursued at the national level to foster newer developments by inviting talented persons to join these new departments. The cry of equality and uniformity of pay scales would definitely arise at the national level but it has to be viewed objectively with the help of a well-documented open policy of developing excellence in academic, scientific and technological pursuits. A well-debated and carefully implemented scheme at the national level will certainly attract

many more persons to scientific research and development relinquishing well-paying administrative and managerial jobs. It is high time that the government should take a lead and collect objective opinion and implement it to improve the incentiveless system prevailing in these academic institutions. This will also attract talented Indians serving foreign countries to return and serve their own country. It would certainly be a great tribute to late Homi J. Bhabha for having initiated the plan by visiting foreign countries and talking to many Indian scientists working abroad, convincing them to come back home and help the country. Working in these

prevailing conditions, some of these scientists have succeeded in putting the country on the international map in their field of specialization. Therefore, an urgent activity hankers for an early initiation of a meaningful step at the national level.

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R. N. SINGH

*Shahu Ji Maharaj University,
Kanpur 208 016, India*

To tie or not to tie: A knotty problem in snakebite management

In India, every year a large number of people die of venomous snakebites though they can be medically treated by administering polyvalent antivenin. This is because most venomous snakebites occur in villages, whereas antivenin is usually available only in urban hospitals. It often takes the snakebite victim an hour or more to reach such a hospital. During this crucial interim period, the victim is usually looked after by untrained persons. The traditional first aid in such cases consists of one or more of the following: (a) 'tying up' the place above the bite; (b) incision of the affected area; and (c) suction (generally oral) of the contents of the wound. It is popularly believed that tying up would delay the spread of snake venom into other parts of the body, while incision and suction are supposed to remove substantial amount of the injected venom. Thus, the basic idea behind these traditional first aid measures is the belief that these may reduce the extent of damage. Do such traditional methods have any scientific basis? Let us see what standard books written by experts have to say about this.

While most experts are in favour of some kind of tying as a first aid measure, opinions vary as to the kind of tying that is beneficial. Two types of tying have been discussed. The first, a

'tourniquet' which is tied tightly so as to block the return of blood through vessels from the occluded limb to the heart¹. This is also referred to as 'haemostatic' or 'arterial tourniquet' in various books^{2,3}. The second kind of tying, is using a 'construction band', which is firm but not tight, in order to impede lymph flow⁴. This is also referred to as 'firm pressure bandaging'³ or 'constricting band'⁵ or 'constrictive bandage'⁶ or 'crepe bandaging'¹. While most books recommend the latter^{1,3-9}, some experts favour only tourniquets^{2,10,11}. One book¹ recommends tourniquets only in the case of bites by snakes having 'dangerously neurotoxic' venom, 'when the delay in reaching medical care is likely to be more than 30 min but less than two hours', although the same book also points out that 'the value of tourniquets has not been adequately investigated in human patients' and the potential danger of tourniqueting is 'gangrenous limbs' owing to lack of blood flow.

Even in the case of incision and suction as first aid measures for venomous snakebites, medical literature seems to be full of conflicting opinions. While some books^{2,4-7,11,12} recommend incision and suction, others^{1,3,8-10,13} raise objections to such first aid measures. It is interesting to note that later editions

of a textbook^{14,15} omit all mention of this issue. There is also no complete agreement as to the risk factors for the person carrying out incision and suction. While Sanford⁵ says mouth suction is not risky 'in the absence of oral lesions'¹ (in the first aider), Yudenich¹⁶ says it is not dangerous 'even when the helper has scratches on the lips and lining of the mouth'.

It is evident that the standard textbooks of scientific medicine published in 1980s contain conflicting opinions regarding the first aid methods in venomous snakebite. However, most textbooks published in 1990s tend to present uniform views on the issue. For example, in recommending incision and suction, the 1987 edition of one textbook⁴ writes: 'When begun promptly, they (incision and suction) may result in the removal of up to 50 per cent (of) subcutaneously injected venom', while the same textbook in its 1994 edition⁹ says: 'Since there is no evidence that incision and suction of the wound improve outcome in humans, and since incision in the field can cause secondary infection and traumatize tendons, nerves, and blood vessels, this procedure is no longer recommended'. Similarly, while the 1985 edition of another textbook⁵ opines: 'It has been stated that if I and S (incision and suction) is

begun within three minutes after subcutaneous envenomation, 22 to 50 per cent of injected venom can be removed'. It changes its opinion in its 1996 edition⁸ to: 'The potential value of I and S is less than the risks, which include delay in antivenin (antivenom) administration. The site of the bite should be wiped but not incised. Incisions can aggravate bleeding, damage nerves and tendons, introduce infection (especially with mouth suction), and delay healing'. The sharply contrasting statements in the successive editions of these two textbooks make one curious to know what kind of experimental studies up to 1980s have led to the statements that 'up to 50 per cent' or '22 to 50 per cent' of subcutaneously injected venom can be removed by incision and suction and what further studies performed during 1990s prompted the same books to contradict their previous statements.

In this context one must make a note of the fact that most standard textbooks are written in developed countries where mainly two classes of people usually become victims of snakebite: zoo workers and pet-snake-keepers who handle venomous snakes; and people travelling through forests. In the first case, the antivenin is always within easy reach of snakebite victims. The same is also true in the second case since travellers and wild life explorers often carry antivenin with them. For example, in USA although every year around 8000 people get venomous snakebites, only 9 to 15 of them eventually die^{9,17}. Therefore, the issue of administering first aid is comparatively less significant for snakebite victims in developed countries. On the other hand, in developing countries like India, where appropriate health care facilities are generally lacking in the villages, a typical snakebite victim may take at least an hour (and often much longer) to reach the nearest hospital, where antivenin may be available. Thus, the knowledge of the best method of administering first aid during this period is of utmost importance for

the people of these countries. This issue, however, is riddled with confusion and conflicts. Moreover, a compounding factor in the problem has been a tendency of popular books written by experts to convey a false sense of safety among the common people. This is reflected in the fact that some books authoritatively recommend tourniquet^{2,18} or ligation¹¹ and incision followed by suction^{2,11,12,16} as first aid measures, while some books are conspicuously silent about any kind of tying¹⁶ or I and S (ref. 18). Although most of these books have been written in 1980s, none of these authors enlighten their readers about the controversial nature of the issue. Thus, the possibility of practising harmful first aid methods remains, even if one earnestly wants to help the victim of a snakebite.

It is strange that such a state of controversy and confusion continues to prevail in the issue of first aid measures in venomous snakebites, when this could have been resolved once and for all using existing scientific methods. In a country like India where, according to a World Health Organisation (WHO) report, every year 20,000 people¹⁷ (6000 to 9000 people according to Whitaker¹⁸) die of snakebites, it is stranger still to observe that medical experts or premier medical research institutes have done precious little to reach a consensus.

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SUDIPTA SARASWATI

Department of Biological Sciences,
Tata Institute of Fundamental Research,
Homi Bhabha Road,
Colaba, Mumbai 400 005, India