Sir,
Snake envenomation is a neglected tropical disease which takes a heavy toll of human lives in India. The bites are more common in rural areas, where the foremost practice is treatment by traditional therapies, which often are not effective and delay specific medical treatment. In India, the exact magnitude of the problem is not known, due to scarce epidemiological data. Ironically, India neither has the largest number of poisonous snakes, nor is antisnake venom (ASV) extremely scarce, yet the mortality is high; this is due to the lack of awareness, scarcity of resources, low priority to the problem, and lack of health programs.

In India, there are various regional species of snakes besides the “Big Four,” which can cause severe envenomation, hence the emphasis on “Big Four” is questionable.[1] The current scenario reflects the loss of the crucial golden hour after the bite because of visit to traditional healers, whose role is debatable. Although a plethora of medicinal plants have shown activity against various manifestations, there is no recorded, proven, or validated data of potent preparations and molecules.[2] In the health-care facility, there is poor compliance with the already-drafted protocols coupled with little experience and confidence of the treating physicians. Availability, affordability, and rational use of ASV is an important issue.

There are multiple problems associated with venom and ASV. The composition of snake venom, varies considerably with species, exhibiting a varied range of pharmacological properties. In India, around 80% of venom from “Big Four” is procured from two districts in Tamil Nadu. In fact, there is scarce supply of quality venom from reliable dealers. Wide geographical intra- and inter-species variation in the immunogenicity of the venom, leading to different constellation of symptoms, is a matter of concern.[1]

There are numerous logistical, marketing, and economic issues with the production and supply of ASV, besides the accompanying side effects. About seven laboratories in India produce polyvalent ASV raised against the traditional “Big Four.” However, the actual production statistics is not known. One of the important limitations of ASV is its high production cost.

The diverse issues related to snake bites warrant a multipronged approach revolving largely around improved guidelines addressing diversity, standard management protocols, preventive measures, and research in venomics and antivenomics.

The strategy for point-of-care management stresses on the immobilization of victim and early administration of ASV.[3] Development of snake farms across various distinct regions in India and collection from a wide geographical regional range, keeping in view the comprehensive details about intra- and inter-species variability, and creating regional venom pools are needed. To achieve the goal of less morbidity and mortality, research in venomics, antivenomics, and toxicovenomics is the top priority.[4] Contemporary research should focus on unmasking the complete antigenic profile of venoms from important and taxonomically undetermined genera from different geographical locations. Detailed exploration into venom composition directly by proteomics or indirectly via high-throughput venom gland transcriptomics and bioinformatics is of vital importance. Efforts should be directed toward the use of recombinant antibody technologies.[5]

The geographical diversity necessitates the development of affordable, broad-range, polyvalent ASV with high potency, covering some regional medically relevant species. Optimization of the dosage schedule can tackle the issue of short supply and also the probability of life-threatening adverse effects. Well-drafted standard immunization protocol and improvement of safety profile by quality control need to be ensured. An alternative to polyvalent form is monovalent ASV, but its utility is restricted and may not be economically viable in a country like India.

The search for various potential inhibitors from plant sources that can adjunct or substitute the ASV activity should continue. Specific, regional ethnobotanical surveys along with the development of a database of plants with antisnake potential would be useful.

The socioeconomic impact of snake bite is profound as many victims may end up with permanent physical and psychological sequelae. Various state governments in India are providing compensation to victims or the
families of the dead and the same should be considered by states with high incidence.

An important requisite is to create awareness and sensitization of rural populations and medical and paramedical personnel by educational and preventive campaigns, highlighting the locally prevalent snakes, early manifestations, proper first-aid measures, and importance of appropriate medical management.

The current scattered data in India does not highlight a realistic view of the magnitude of the problem of snake bite. To facilitate appropriate management, a mobile phone-enabled, web-based information program may be developed and validated along with information, education and communication activities. It will help first responders to take informed decisions within the short possible time and enhance community awareness and participation, besides acting as a national registry of snake bite cases. Appropriate logistic policies such as stocking of ASV and other treatment modalities can be formulated, ensuring optimal utilization of health-care resources. Coordinated efforts at regional and national levels can help to reduce the impact of the problem and hence the astounding death count.

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References
1. Guidelines for the management of snake-bites, 2nd edition; 2016. Available from: http://apps.searo.who.int/PDS_DOCS/B5255.pdf?ua=1. [Last accessed on 2020 Apr 18].
2. Gupta YK, Peshin SS. Snake bite in India: Current scenario of an old problem. J Clin Toxicol 2014; 4:1-9.
3. National Snake Bite Management Protocol. Directorate General of Health Services Ministry of Health and Family Welfare Government of India. Available from: http://164.100.130.11:8091/nationalsnakebitemanagementprotocol.pdf. 2009. [Last accessed on 2020 Apr 20].
4. Lomonte B, Calvete JJ. Strategies in “snake venomics” aiming at an integrative view of compositional, functional, and immunological characteristics of venoms. J Venom Anim Toxins Incl Trop Dis 2017;23:26.
5. Gutiérrez JM, Calvete JJ, Habib AG, Harrison RA, Williams DJ, Warrell DA. Snake bite envenoming. Nat Rev Dis Primers 2017;3:17079.

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