



Positive Outcomes of Inpatient Rehabilitation in a Snake Bite Patient with Pulmonary Complications: A Case Report

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Case Study

ABSTRACT

Snake bites are a common medical emergency and workplace danger, particularly in tropical India, where farming is a key source of income. We report case of 55 year old female patient reported to medicine department on 25\09\2021 with an alleged history of snake bite over her right ankle in evening when she was the working in the farm. She undergone 2 weeks of In-hospital rehabilitation along with medical management and had shown positive outcomes. This case report's purpose was to focus on the significance of prompt surgical treatment and essential physiotherapy rehabilitation to attain the functional goals with to respect to patient and its prognosis.

Keywords: Snake bite; In-patient rehabilitation; physiotherapy; bilateral pneumonia.

1. INTRODUCTION

Snake bites are a common medical emergency and workplace danger, particularly in tropical India, where farming is a key source of income [1,2]. It envenoms underprivileged communities living in rural tropics, perpetuating the cycle of poverty. Snake venoms are complex protein combinations with a variety of harmful effects. The enormous variability in snake venom composition can be linked to the vast range of clinical symptoms in envenoming, from local tissue harm to potentially life-threatening systemic repercussions. The only particular therapy for envenoming is intravenous antivenom injection. Antibiotic treatment, analgesics, ventilator support, hydration therapy,

hemodialysis, and analgesics are also employed. New toxin inhibitors and other treatment solutions based on recombinant antibody technology are being investigated [3,4]. To combat snakebite envenoming on a global scale, the WHO, the research community, antivenom manufacturers, regulatory agencies, national and regional health authorities, professional health organizations, international funding agencies, advocacy groups, and civil society institutions must all work together [5]. Herein, we report a patient with history of snake bite causing bilateral lower lobe pneumonia who undergone 2 weeks of in-hospital rehabilitation along with medical management and had shown positive outcomes.

2. PATIENT INFORMATION

A 55 year old female patient was reported to medicine department on 25\09\2021 with an alleged history of snake bite over her right ankle in evening when she was the working in the farm. She complains of severe burning pain over right ankle, along with pain in abdomen, breathlessness, headache, due to which the patient feels restlessness. She underwent various emergency treatment and lab investigations. She was admitted to Medicine ICU on 26\09\2021 and was referred for physiotherapy in view of difficulty in breathing, and improving quality of life.

3. TIMELINE

Table 1. Timeline for the study

Date of Snake bite	25/9/21
Date of Admission	25/09/2021
Date of Physiotherapy commencement	27/09/2021
Date of discharge	09/10/2021
Date of follow up	24/10/2021

3.1 Clinical Evaluation

On observation, the patient was conscious and seen in a long sitting position with the propped-up head end of the bed, in respiratory distress and receiving supplemental oxygen 6L/min via face mask. There was the use of accessory muscles of respiration while breathing along with decreased chest movement. Active coughing was present. On examination, bilateral pitting edema was present over the lower extremities. Catheterization had been attached for urine drainage. The bedside monitor had shown vitals; pulse rate of 104/min, BP 112/80 mmHg, respiratory rate of 18/min. On auscultation, there was the presence of bilateral crackles in the lower lobes of the lung as well as diminished breath sounds on both sides. Auscultation of heart sounds demonstrated irregular type rhythm.

3.2 Diagnostic Assessment and Interpretation

Chest X ray



Fig. 1. Chest X ray findings reveal Heterogeneous Opacity in Bilateral middle and lower zones of Lung

3.2.1 Therapeutic intervention

Physiotherapy was started with the goals of improving respiratory function, secretion clearance thereby increasing oxygen saturation and exercise tolerance with functional independence. During 1st week sessions started with nebulization, chest physiotherapy which included clearance techniques using postural drainage positions which encompassed percussion and vibration followed by suctioning. This was repeated twice daily. Breathing exercises including diaphragmatic and deep breathing exercise [6] was taught to the patient and was carried out for 10 repetitions twice daily. Proper positioning was given to the patient and was also guided to nursing staff for secretion drainage and improving ventilation. On the 4th-day incentive spirometry was started to improve lung function and respiratory muscle training [7]. Spirometry was performed by the patient under supervision every 2 hourly with 10 repetitions each for initially 1 set and further changed to 3 sets. Since the patient was bedridden mobility exercises were begun wherein active ankle toe movements, heel slides, hand pump exercise were taught. Followed by thoracic expansion exercise, segmental expansions were added. Mobilization including; upper and lower extremity mobility exercises were taught. Each movement performed for 10 repetitions. Maintaining saturation patient was taken in bedside sitting position for 10-15minute twice daily followed by standing position thereafter. Standing was successfully achieved for 10 minutes initially.

During this 2nd week of rehabilitation, the patient was in quite a stable position and was able to sit

and stand independently while maintaining adequate saturation up to 98%. For measuring functional capacity, a 6-minute walk test was imposed [8]. The patient was able to walk about 315 meters in six minutes, with 2 intervals of relaxation.

3.3 Follow Up and Outcome

This treatment protocol was carried out for two weeks and the interventions used had shown positive, good outcomes. There was an improvement in the lung function majorly, increased lung expansion. Spirometric values improvised to 1200cc in inspiratory. The patient was able to maintain an oxygen saturation of 98 to 100% on room air. Also, there was an improvement in his mobility skills heading towards ambulation. This has greatly impacted the recovery process. Moreover, the patient's family member was taught exercise protocol to be followed regularly at home after discharge. The patient was monitored over a telephonic conversation for an appropriate training or assistance. She was able to walk 490 m without rest time at the time of follow up after 2 weeks of discharge.

4. DISCUSSION

There is a paucity of study in the literature in regards to commencement of physical therapy in Snake Bite patients associated with pulmonary complications. Our study will be one of its kinds that would give a tailored physiotherapy program for such patients.

In this case, patient complaints of breathlessness, early fatigue performing basic Activities of daily living and reduced strength. After clinical evaluation a plan of care was made which included Breathing retraining and airway clearance technique which has a benefit in improving the respiratory patterns which included increase in tidal volume, increase in minute ventilation and decreased respiratory rate. Secretion accumulation in airways is one of the most important factors for exacerbation of symptoms which leads to easy fatigue and dyspnoea to deal with the same chest physiotherapy which consisted of percussion and vibrations technique was performed in patient department. A interval based exercise training program was designed which consisted of aerobic and progressive resistance training to reduce the easy fatigability and improving strength of the voluntary group of muscles and

thus leading to improvement in activities of daily living and improving the functional capacity. There is evidence to support the importance of specific exercise regimens to minimize impairments and enhance the function. The exercise program has given according to the FITTs principle as per the guidelines of ATS for pulmonary rehabilitation [10,11]. The patient was instructed to follow all the exercises as a part of home program and was provided with written protocol and advised for follow-up visits. A timely telephonic report was taken from the patient. This case report's purpose was to focus on the significance of prompt surgical treatment and essential physiotherapy rehabilitation to attain the functional goals with to respect to patient and its prognosis.

Table 2. Pre and post treatment analysis

Outcome measures	Pre-treatment	Post-treatment
Modified medical research council scale [9]	Grade III	Grade I
Spirometry values	<900cc	1200cc
6 minute walk distance test	315 m	490 m

5. CONCLUSION

Patient suffering from pulmonary complications following snake bite shows a marked decrease in exercise capacity and hence it greatly affects her ability to perform day to day activities, experiencing more fatigue, vastly affecting her quality of life. So precise planned early physical therapy intervention had shown to improve and regain a functional capacity, mobility skills, and exercise tolerance aiding recovery thus reducing hospital stay of the patient.

CONSENT

Prior to the treatment, patient and her caregivers were educated about treatment protocol and importance of physiotherapy and early rehabilitation and a proper informed consent was taken from the patient.

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Clinical Profile and outcome of envenomous snake-bite at tertiary care centre in western Maharashtra | International Journal of Medicine and Public Health [Internet]. [cited 2021 Oct 30]. Available: <https://www.ijmedph.org/article/179>
2. Yadav V, Naqvi WM, Burhani T. Pandemics and physiotherapy: An overview of the role of the physiotherapists in restoring functions and quality of life. International Journal of Research in Pharmaceutical Sciences [Internet]. 2020;11(1). [cited 2021 Jun 14]; Available: <https://covid19.elsevierpure.com/en/publications/pandemics-and-physiotherapy-an-overview-of-the-role-of-the-physio>
3. Gutiérrez JM, Calvete JJ, Habib AG, Harrison RA, Williams DJ, Warrell DA. Snakebite envenoming. Nat Rev Dis Primers. 2017;3(1):1–21.
4. Ghordadekar D, Naqvi WM, Sahu A. A case report on impact of physiotherapy rehabilitation on post coronary artery bypass graft. 2020;6.
5. Ghosh S, Mukhopadhyay P. Management of Snake Bite in India. :6.
6. Aepli R. [The role of respiratory physiotherapy in an intensive care unit]. Schweiz Med Wochenschr. 1979;109(40): 1518–22.
7. Franklin E, Anjum F. Incentive Spirometer and Inspiratory Muscle Training. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 [cited 2021 Nov 23]. Available: <http://www.ncbi.nlm.nih.gov/books/NBK572114/>
8. ATS Statement. Am J Respir Crit Care Med. 2002;166(1):111–7.
9. Mahler DA, Wells CK. Evaluation of clinical methods for rating dyspnea. Chest. 1988; 93(3):580–6.
10. Current devices of respiratory physiotherapy - PubMed [Internet]. [cited 2021 Oct 30]. Available: <https://pubmed.ncbi.nlm.nih.gov/19158964>
11. Saifee SS, Yadav* V, Jain M, Kulkarni CA, Naqvi WM. A comprehensive pulmonary rehabilitation program for the management of post- tuberculosis pneumothorax: A case study. [internet]. 2021;21(1):10. [cited 2021 aug 3] Available: <https://jmpas.com/abstract/551>

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