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# Managing a Child with Post-streptococcal Glomerulonephritis in a Remote, Rural Clinic

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## Abstract

AMRIT Clinic in Bedawal village, located about 25 km from the nearest town and 100 km from Udaipur city, serves about 3000 tribal families. In this article, we discuss the management of a child with poststreptococcal glomerulonephritis (PSGN), who presented to us in unusual circumstances. Although PSGN is not an uncommon clinical condition, the goals of sharing this experience are threefold: sensitizing our urban counterparts to the challenges of managing such cases in the rural settings; describing the criticality of maintaining a balance between traditional beliefs and evidence-based medicine; and highlighting the value of “upstream” prevention rather than “downstream” treatment.

**Keywords:** Glomerulonephritis, prevention, rural

## CASE STUDY

Ram (*name changed*), an 8-year-old boy was brought to our clinic by his mother. She had noticed swelling of his face a week earlier that gradually progressed to his abdomen and legs. The child had stopped passing urine for 3 days, was not eating anything for 2 days, and had started vomiting since that morning. On probing further, we learned that he had numerous skin pustules a few weeks back, for which he received some topical and oral medication. Currently, the child was receiving some traditional medicine (a concoction made from tree bark and water).

Ram's father was a migrant manual laborer who worked in Udaipur. He had met with an accident recently and was admitted in a hospital there. He was being looked after by his 15-year-old son and an elderly relative. Ram's mother was a homemaker who could not read and write.

The child was lethargic and afebrile. His blood pressure (BP) was 115/80 mm of Hg (>95<sup>th</sup> centile), pulse rate was 79 beats per minute, respiratory rate was 28 per minute, and oxygen saturation in room air was 98%. He weighed 22.2 kg. Salient general physical examination findings included signs of some dehydration, facial and bilateral pedal edema, and generalized healed skin lesions. There was no evidence of congestive heart failure or jaundice. Apart from ascites, the remaining systemic examination was normal.

A presumptive diagnosis of poststreptococcal glomerulonephritis (PSGN) was made. A blood sample was sent to the nearest

laboratory (25 km away) for complete blood counts (CBC), serum potassium, serum creatinine, and blood urea. From the past experience, we expected the reports to be available after 12 h. An antiemetic was administered, followed by oral rehydration solution over 4 h. A single dose of intramuscular benzathine penicillin (600,000 IU) was injected, after test dose. Intravenous furosemide and oral amlodipine were started for hypertension and anuria. We decided to add broad-spectrum antibiotics (ceftriaxone) for a possible urinary tract infection. The child passed cola-colored urine after 2 h, and on subjecting it to multi-strip testing, we noted blood (3+) and albumin (4+). His BP and urine output were monitored closely. His mother was explained the nature of illness, the medications being provided, and the details of further management (including possible referral to the city hospital for dialysis). This was done in simple vernacular language, at the level of her understanding. We, in turn, were informed that she wanted to continue the traditional medication. After negotiating, we agreed to allow that, provided it did not exceed the permissible fluid restriction.

Ram's lethargy decreased after a few hours and he ate some food. By the next morning, he had passed urine several

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**Figure 1:** Courtesy: Dr Gargi Goel. Ram with his elder brother after recovery, outside AMRIT Clinic

times, the facial and pedal edema had decreased, and BP was 115/74 mmHg. Blood reports revealed normal CBC parameters and serum potassium (4.79 mEq/dL), but elevated serum creatinine (5.26 mg/dL) and blood urea (188 mg/dL). We again emphasized the need for referral; however, because of the family circumstances and expense involved, the mother was unable to manage alone. She also wanted to consult another traditional healer. After mutual discussion, we agreed to let her take the child to him, provided Ram returned by the evening, which he did.

Over the next 2 days, both modalities of treatment continued. He remained normotensive, the edema and ascites continued to decrease, and urine output was satisfactory. As the child lived nearby, and the mother was facing difficulties in managing everything by herself, we discharged him on oral medication (furosemide, amlodipine, and cefixime). Home visits by our team members were planned to monitor his BP and status and ensure compliance. On the 3<sup>rd</sup> day, it was noted that his BP had increased (118/80 mmHg, >95<sup>th</sup> centile), edema had increased, and urine output was less. By this time, Ram's brother had returned home to accompany him to the city, the family had greater trust in us, and they were willing to discontinue traditional therapy.

We arranged for transport and our team accompanied Ram to a hospital in Udaipur, where we helped him get admitted. He was continued on furosemide and amlodipine, and peritoneal dialysis was started. Within a few days, there was gradual symptomatic relief, the creatinine levels normalized, and he was discharged. On returning, he continued to visit our clinic for biweekly monitoring [Figure 1]. We gradually titrated the antihypertensive medication, and by 3 weeks, he was deemed recovered.

## DISCUSSION

PSGN is a common cause of acute renal failure in children. Although the prognosis is good if diagnosed early and timely

management are started, many children develop complications such as acute kidney injury, hypertensive emergency, encephalopathy, and congestive heart failure.<sup>[1]</sup>

Annually, 470,000 cases of PSGN are reported worldwide, 97% from developing countries. It has been observed that within countries, a huge inequality exists between the under and more privileged populations. In Northern Australia, a study reported that though the Aborigines constituted 30% of the total population, they contributed to 96% cases of PSGN.<sup>[2]</sup> Closer home, it was observed that most patients in a report of PSGN from a referral hospital in South India belonged to the lower socio-economic strata.<sup>[3]</sup> The main reason cited for this disparity is the higher prevalence of streptococcal skin infections in poorer populations. This occurs due to multiple factors; poor hygiene, overcrowding, neglect, delay or inadequate treatment of skin diseases, and scabies.

While managing Ram, our team members displayed multiple competencies that promoted family participation and shared decision-making. These included communicating in a culturally informed manner; acknowledging and understanding the family's beliefs and circumstances; and displaying respectful and nonjudgmental attitudes. These skills helped us deliver modern healthcare with simultaneous traditional therapy, without triggering conflict. By helping them and winning their trust, we managed to convince the family to take Ram for appropriate treatment. We also took the responsibility of coordinating his care beyond what was feasible in the Clinic setting, i.e., enabling transport and facilitating hospital admission.

All these efforts saved the child from developing complications of PSGN and his family from the associated financial burden. Although it is critical to ensure access to such care for children living in remote and rural areas everywhere, even a well-functioning health system will get inundated with delivering such care. Prevention of illness, therefore, assumes paramount importance.

Let us revisit the framework of disease prevention based upon the natural course of the disease and its consequences. There are several levels: primordial (modifying the environmental risk factors before the illness enters the community); primary (individual actions taken before the onset of illness); secondary (actions taken to halt the progress of disease in early stages, such as early diagnosis and adequate treatment); and tertiary (rehabilitation to minimize the long-term consequences of the illness). In public health, upstream efforts (primordial and primary prevention) are often considered more cost-effective than downstream efforts (secondary and tertiary prevention). By reduction in illness, there is a corresponding decrease in the burden on health systems, enabling more quality care,<sup>[4]</sup> as well as an improvement in the overall health and well-being of the population being cared for.

With respect to PSGN and similar illnesses, the following measures would be effective:

- Primordial prevention: At the systemic level, improving living conditions to prevent overcrowding and infections, and increasing the availability of water, thus promoting hygiene
- Primary prevention: In the intense heat and humid conditions of rural India, water scarcity and lack of clean clothes are major constraints faced by underserved communities to maintain hygiene. Educating families on hygienic behaviors (hand hygiene, daily bathing, and cough etiquette) can, however, offset some of these constraints. Appropriate and early treatment of impetigo and scabies at the primary care level will reduce PSGN. Mass ivermectin prophylaxis is an effective control measure in areas with widespread scabies, which will indirectly decrease skin infections, and subsequent PSGN
- Secondary prevention: As demonstrated in this case, early detection and timely management required competent primary healthcare providers, a pediatrician available for consultation, and access to diagnostics. Primary healthcare services should be expanded at scale to replicate this
- Tertiary prevention: As PSGN is primarily an acute disease in children, this is not applicable.

Understanding and contributing to the underlying causes will help improve health and well-being of all children, especially the most underserved. Pediatricians tend to focus on providing “downstream” care, when the child is ill. However, we are equipped with the understanding and mandate to work “upstream,” which tends to get neglected. Increasing the focus

on the latter can effectively reduce illness load. This would provide us with opportunities to offer better quality care to sick children, and at a lesser cost.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient’s parents have given consent for images and other clinical information to be reported in the journal. The patient’s parents understand that the names and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

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