Interventions by TN chapter of Indian Society of Gastroenterology (TN-ISG) and its outcomes to address a public health problem in Tamil Nadu – hepatotoxicity caused by ingestion of rodenticide (yellow phosphorus)

1. **Study by TN-ISG establishes hepatotoxicity caused by phosphorus poison (rodenticide) ingestion as the equivalent of Paracetamol overdose causing hepatotoxicity in the West.[1]**

   A survey done by TN-ISG in six districts of Tamil Nadu from January to June 2019 identified rodenticide ingestion as the commonest cause of acute hepatotoxicity. The ratio of number of patients with hepatotoxicity due to rodenticide to paracetamol overdose was 450:6 (i.e. 75:1). Of 451 rodenticide hepatotoxicity patient, 75% were 15–34 years old and 159 patients (35%) had poor outcome (131 died, 28 discharged in moribund state). Of these patients, 396 patients had conservative management, 54 patients underwent plasma exchange (PLEX) while only one patient had liver transplantation.

   Patients with rodenticide hepatotoxicity can be treated by urgent liver transplantation and nontransplant options. At present, the majority (>99%) of rodenticide hepatotoxicity patients in Tamil Nadu cannot access urgent liver transplantation, this situation probably applies to the whole of India.

2. **TN-ISG guidelines on management of rodenticide poison[2]**

   As a response to the findings of the above study, TN-ISG brought out guidelines on management of rodenticide poison, stressing on non-transplant treatment options. Some of the key interventions suggested are

   a) the need to avoid / restrict use of sedative medicines in patients with hepatotoxicity
   b) highlighting the use of plasma exchange. Incidentally, the recommendations on the use of plasma exchange (indications, contra-indications) are the first in the world for use in acute liver failure (ALF) / severe acute liver injury (ALI). It is likely that these same recommendations can be used to treat ALF / severe ALI patients caused by to any etiology.
   c) The TN-ISG also suggested the need to have a "hub and spoke" model of delivery of care in each district of Tamil Nadu : first aid and decontamination to be done at primary health centre, admitting for close monitoring for any complications / vital organ dysfunction at district Taluk hospital and specialised care including plasma exchange to be provided in the government medical college hospital in each district.
   d) The need to ban or regulate the sale of rodenticide poison was also suggested.

3. **TN-ISG recommendations implemented across Tamil Nadu by Government of Tamil Nadu (Tamil Nadu Accident and Emergency Care Initiative under National Health Mission).**

   Within six weeks of publishing the TN-ISG Guidelines on Managing Rodenticide Poison, the Government of Tamil Nadu adopted these recommendations. The medical and nursing faculty (717 persons) in the Government hospitals where these patients seek care underwent specialised training in virtual mode. As an initial step, centrifugal plasma exchange machines have been installed in six government medical college hospitals. The team of doctors and nurses in these six hospitals underwent further ion-site training in the delivery of plasma exchange.

This scheme appears to be rapidly bearing fruit. For example, in the first 3 months, plasma exchange was provided to 35 patients with rodenticidal hepatotoxicity in Madurai Government Medical College.

Regular audit and group learning sessions have started in this network aimed to improve survival in rodenticidal poison patients.

The Tamil Nadu Government has also initiated steps to regulate the sale of rodenticides to reduce easy access to this poison.

References:

1. Govindarajan R, Ramamoorthy G, Shanmugam, et al. Rodenticide ingestion is an important cause of acute hepatotoxicity in Tamil Nadu, southern India. Indian J Gastroenterol. 2021 Aug;40(4):373-379.

2. Eapen CE, Balasubramanian V, Ramamoorthy G, et al. Management of rodenticide poisoning: Tamil Nadu chapter of Indian Society of Gastroenterology guidelines. Gastroenterol Hepatol Endosc Pract 2022; 2: 1-6

3. TN's ban on rat poison to curb suicides is a good move - but more needs to be done. https://www.thenewsminute.com/MONDAY, SEPTEMBER 05, 2022