

## Drowning in Concentrated Sugar Syrup

VANDANA TALWAR, NISHANT SOOD AND PK VERMA

*From the Department of Anesthesia and Intensive Care, VMMC and Safdarjung Hospital, New Delhi, India.*

*Correspondence to:*

*Dr Vandana Talwar,*

*A1 / 43, Azad Apartments,*

*Sri Aurobindo Marg,*

*New Delhi 110 016, India.*

*E-mail: vandtal@yahoo.com*

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Drowning is one of the two leading causes of accidental death in children. Most of the cases can be attributed to fresh or salt water drowning. We report an unusual case of acute respiratory distress syndrome in a one year old child following drowning in concentrated sugar syrup, in whom timely intervention and early supportive therapy resulted in a favorable outcome.

**Key Words:** *Acute respiratory distress syndrome (ARDS), Drowning, Sugar syrup.*

**D**rowning is the process of experiencing respiratory impairment from submersion/immersion in liquid. Drowning outcomes are classified as death, morbidity and no morbidity (2002 World Congress on Drowning)(1). The earlier classification which was based on etiology and outcome (fatal/ drowning and non fatal/ near drowning) is now included within the spectrum of drowning. All victims of drowning have a unique characteristic of respiratory impairment.

Small children are at risk of drowning in wading pools, bathtubs, buckets, toilets, spas etc. We report an unusual case of accidental drowning of a 1-year old child in concentrated sugar syrup.

### CASE REPORT

A 1-year old male child was admitted in the emergency department with history of fall into a tub of concentrated sugar syrup (*chashni*) 15-20 minutes prior to admission. There was a marriage party in the house and sweets were being prepared in the open. Apparently, the child fell accidentally into the tub of *chashni*, and was found by his elder sibling after an

unknown period of submersion. On admission, the respiratory rate was 50/minute and the rectal temperature was 34.5°C. Auscultation of the chest revealed bilateral coarse crepitations. The radial pulse was feeble and regular with a rate of 140 per minute and the systolic blood pressure was 60 mmHg. Glasgow coma score was 7 (E2 V2 M3). The child had normal tone and deep tendon reflexes. Pupils were of normal size with normal reaction to light. There was no evidence of any other injury.

Arterial blood gas analysis revealed hypoxemia, hypercapnia and acidosis. The patient was immediately intubated and transferred to the ICU for further management. He was placed on volume control ventilation. Normal saline bolus of 15 mL/kg was given intravenously. The child was placed under an overhead radiant warmer and dopamine infusion was started to maintain the systolic blood pressure above 80 mmHg. He became normothermic within 3 hours and normotensive within 6 hours. The initial blood sugar was 128 mg/dL. The child was also started on ceftriaxone and metronidazole. The child developed acute respiratory distress syndrome (ARDS) on day 3 which was appropriately managed.

Antibiotics were later changed to a combination of piperacillin, tazobactam and gentamicin, as the tracheal culture showed presence of *Klebsiella* and *Acinetobacter*. The child was gradually weaned off ventilatory support and was extubated on the eighth day. He remained alert and responded well to commands.

A sample of sugar syrup was obtained from the father of the child who runs a sweet shop. On analysis, it revealed a pH of 4.5 and culture yielded a mixed growth of organisms.

## DISCUSSION

Drowning usually occurs in fresh or salt water, although rare cases of drowning in detergents or hydrocarbons have been noted(2). Drowning in sugar solution may be associated with a unique set of problems. Sugar syrup may contain impurities and pathogenic bacteria, thus increasing the risk of infection after aspiration of fluid. The highly viscous solution may block the tracheobronchial tree and endotracheal tube. Increased airway resistance due to plugging of the patient's airway, as well as release of inflammatory mediators may impair gas exchange and contribute to the development of ARDS(3). It may also necessitate frequent suctioning and bronchoalveolar lavage which could be hazardous due to the underlying cardiopulmonary status of the patient.

Drowning is a leading cause of injury related death in children. Toddlers and adolescent males are at greatest risk(4). Since majority of drownings are preventable, prevention (rather than rescue or resuscitation) is of utmost importance in reducing the incidence of drowning. The preventive steps undertaken depend on the age of the child, the site of submersion and the circumstances surrounding the event(4). Parents and caregivers should be advised to never leave children alone or in the care of another young child while in bathtubs, pools or other open standing water. A supervising adult should always be

present close by. In addition, people should be trained on how to respond to a drowning, how to obtain help and how to perform emergency care such as CPR and first aid(4).

In our patient, drowning could have been prevented had a supervising adult been present at the site of accident and/or the pan of *chashni* had not been left unattended. We wish to emphasize that although drowning in concentrated sugar syrup is rare, there exists the possibility of occurrence of such cases in this part of the world, where local confectioners prepare sugar solutions in large open urns in their houses or shops, thus running the risk of accidental fall of small children into such solutions, especially when unsupervised.

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