

Scientific Study of Epidemic Dropsy in a Family



Medical Science

KEYWORDS : Epidemic dropsy, Argemone oil, Sanguinarine, pregnancy

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ABSTRACT

- Epidemic dropsy is a clinical state resulting from uses of edible oils (mustard oil) adulterated with Argemone Mexicana oil. Sanguinarine and dehydrosanguinarine are two major toxic alkaloids of argemone oil. Argemone poisoning usually occurs in outbreaks. Isolated cases are uncommon. We here report Epidemic dropsy in a family from a village in Palanpur district, Gujarat. Four family members affected, three females and one male, among them one female is 6 months pregnant had an intrauterine death and termination of pregnancy, whereas rest three had edema, CCF, anemia and are treated conservatively.

INTRODUCTION-"Dropsy" means swelling of the body. Epidemic dropsy is a disease characterised by edema, cardiac insufficiency, GI disturbances, vascular changes resulting from inadvertent ingestion of seeds of Argemone Mexicana (Mexican poppy)¹. Sanguinarine and dehydrosanguinarine are two major toxins which cause widespread dilatation, proliferation and increased capillary permeability. Leakage of protein rich plasma component into extracellular compartment leads to the formation of edema. The hemodynamic consequences of this vascular dilatation and permeability lead to a state of relative hypovolaemia with a constant stimulus for fluid and salt conservation by the kidney². Clinical features starts with GI symptoms followed by cutaneous erythema and pigmentation, respiratory symptoms, CCF, anemia, hypoproteinemia, mild to moderate renal azotemia, Glaucoma & retinal hemorrhages are common manifestations². There is no specific therapy. Prevention of adulteration of edible oil and symptomatic treatment of CCF, respiratory symptom, administration of antioxidants and multivitamins, remain mainstay of treatment.

The condition was first reported by Lyon in 1877 from Calcutta and since then many outbreaks occurred in many countries. There was a major outbreak of epidemic dropsy in Delhi in 1998 resulting in many deaths. In India many cases reported from west Bengal, Bihar, Orissa, Uttar Pradesh, Madhya Pradesh, Maharashtra and Gujarat. In Gujarat some cases of epidemic dropsy reported from Panchmahal district in 2012. Many outbreaks of epidemic dropsy have occurred in many countries including Ethiopia, Saudi Arabia, South Asia & European countries.

The word Argemone is derived from the Greek word "argema" meaning cataract in the eye. As the juice of the plant was used as a remedy in diseases of the eye. In India the plant is known as "Satyanashi"¹. Epidemic dropsy occurs due to use of contaminated mustard oil with Argemone Mexicana for cooking and massage. Adulteration of other types of oils (linseed, groundnut and other vegetable oils, wheat flour) has also been reported¹. The active toxic principle of Argemone oil, the alkaloid Sanguinarine,

is able to withstand normal cooking temperature and hence appears to be heat stable. Minimum concentration of 1% of Argemone oil as an adulterant was necessary to produce clinical features¹¹. The maximum permissible upper limit is 0.01% in edible oils. The duration of exposure is also of vital importance. Sanguinarine can be retained in GI tract, liver, lung, kidney, heart and serum for up to 96 hours after ingestion due to binding to plasma proteins¹³. This may lead to cumulative toxicity even with low dose exposure over prolonged period.

Scientific study of epidemic dropsy in a family :-Here we are reporting a scientific study of 4 cases of epidemic dropsy in a single family presented with similar complaints and clinical features. A 48yr female with low socioeconomic status reported to civil hospital Palanpur and then referred to BJMC Civil Hospital Ahmedabad in June 2015 with history of consumption of groundnut oil followed by complaints of vomiting 4-5 episodes/day for 3 days and vomiting subsided with local medication. Later patient developed bilateral pedal edema of 15 days duration. She had facial puffiness. Patient also complains of breathlessness since 2-3 days. On examination patient is afebrile with Heart rate-102/min/R, Blood pressure was 120/80mmHg and JVP was raised. There was associated bilateral pitting edema, erythema over chest and abdomen present. Patient's all investigations are normal except Haemoglobin - 7.8 gm/dl, total protein -4.2 gm/dl and s.albumin -2.2 gm/dl. ECG shows sinus tachycardia, fundus examination is normal. Later after 2-3 days patient developed decreased urine output and her creatinine was 4.4mg/dl, urea-70mg/dl, patient was treated conservatively with diuretics, blood transfusions, multivitamins, O₂ inhalation and kept under observation. Later patient's creatinine improved to 1.5 mg/dl and urine output also became adequate in next 10-15 days.

Husband of this woman, a 68 year old male had bilateral pedal edema of 15 days duration. He is also having facial puffiness and low grade fever. Pallor present and had bilateral pitting edema. Patient's all investigations are normal except moderate anaemia

and hypoproteinaemia .His fundus examination was normal.

Then other family members affected are daughter and daughter in law of the above patients. The daughter is 20 yr old female had normal clinical profile and mild pedal edema of 15 days duration. All reports within normal range except patient had mild anaemia. The fundus examination is normal.

Lastly a 24 year old pregnant female of 24 weeks pregnancy had bilateral mild pedal edema, generalized weakness and mild abdominal pain. On examination vitally stable and her all investigations are normal except moderate anaemia, fundus examination is normal. Antenatal ultrasonography showed no fetal cardiac activity and so underwent termination of pregnancy.

All affected family members was tested for serum sanguinarine and all are positive for argemone oil (Sanguinarine positive).

All family members treated with diuretics , antioxidants, multivitamins and blood transfusion,FFP transfusion for about 2 weeks . The patients improved in month and was to remain in our follow up for 3 months.

DISCUSSION:

Epidemic dropsy usually occurs in outbreaks. In india most cases have been reported from West Bengal, Bihar, Orissa, Madhya Pradesh, Uttar Pradesh and Delhi and also some cases from panchmahal district in Gujarat in 2012 ¹. The disease was first reported in 1877 from Calcutta. Since then numerous epidemics have been documented, worst ones being in 1934 and 1998 (Delhi). In both epidemics more than 2000 people were involved ¹. Adulteration of edible oil with the toxin is generally unintentional as the disease occurs in outbreaks despite common growth of the mexican poppy plant and easy availability of its seeds. The argemone oil is pungent just like mustard oil and this makes detection of adulteration impossible without the aid of laboratory support ⁵. Contamination of linseed oil, ground nut oil, ghee and wheat flour can also cause the disease. In our cases contaminated ground nut oil was being consumed. Body massage with the adulterated oil can also cause the disease ⁴. Minimum concentration of 1% of argemone oil in mustard oil is sufficient to produce epidemic dropsy ⁴. The disease usually occurs in families coming from low socio economic status. The persons consuming protein rich diet manifests a mild form of the disease ⁴. Incidence of the disease is usually highest in the month of July-August and lowest in March-Aprils ¹. Breast fed babies and children under two years of age do not suffer from dropsy ¹². Sanguinarine+ dehydrosanguinarine,the toxins present in argemone oil, cause the disease. These are thought to affect the carbohydrate metabolism,raising the level of pyruvic acid. This causes inhibition of Na+K+ ATPase DNA damage, decreased glutathione stimulating hormone level and increase lipid peroxidation. Free radicals are generated and widespread capillary permeability and vasodilatation occurs. These changes are responsible for ocular and other clinical manifestations of the disease ¹⁴. Though the disease occurs in epidemics isolated cases are reported. Onset of the disease may be acute or subacute .Com-

monest finding is the bilateral pedal edema which has been observed in all of our cases .The swollen legs may be erythematous and tender and also erythema of other body part (one of our patient had erythema of abdomen and chest¹¹.Pleural and pericardial effusion, ascites may occur and our one patient had these findings .Nausea ,vomiting and diarrhea also occur and all our patient had these complaints. Low grade fever also observed in two patients. Cardiac and renal failure determine the prognosis in these patients and one of our patients had these symptom ¹² . Mild derangement of liver functions may be there ¹². One of the patients had hepatomegaly and LFT is normal in al our cases. Ocular manifestation include retinal venous dilatation, haemorrhages and papilloedema.Five to fifteen percent of the cases develop glaucoma and may require urgent management to prevent blindness ⁴. Bleeding tendencies and peripheral neuritis are also known ⁴. Mild to moderate anemia occur in majority of patients and our all patients had moderate anaemia. Cause of death is cardiac and respiratoryfailure in most of the cases ¹.

Diagnosis of the disease requires a high degree of clinical suspicion. The edible oil is tested for the presence of argemone oil. Confirmatory test is detection of sanguinarine in serum or urine by paper chromatography ¹⁴. Nephritic syndrome, CCF, myxedema, anaemia, hypoproteinemia and beri beri are conditions considered in differential diagnosis ⁴. Treatment is largely symptomatic. Withdrawal of the contaminated cooking oil is the most important initial step. Diuretics, anti-oxidants (VitC and E), multivitamins, blood transfusions and steroids in some cases are beneficial⁴. Aspirin, indomethacin, ephedrine ,and clonidine are used for glaucoma. Some cases of glaucoma may require surgical management ⁴. Some cases of respiratory failure may require ventilator support and some cases may require dialysis for renal failure¹³. Glaucoma is a later manifestation occurring after about four weeks⁴. All cases of epidemic dropsy should be subjected to regular eye examination for eight to twelve weeks⁴.

PROGNOSIS:

Mortality is usually due to CHF, pneumonia, respiratory distress syndrome or renal failure and is around 5%. Long term follow up studies are scanty and some studies shows 25% of cases will have edema beyond 2 months and 10% beyond 5 months. Skin pigmentation and hair loss lasts for four to five months following the disease. Majority of the patients completely recover in about three months.

CONCLUSION- Epidemic dropsy result from consumption of adulterated edible oil[most common is adulterated mustard oil].t This could be prevented by strict supervision on the quality of the sale of mustard oil in the open market. Stringent action should be taken against the unscrupulous trader so that no one could dare to sell such adulterated oil and also educating farmers for selective cultivation of yellow seeded mustard

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