BACKGROUND

Dengue is caused by four flavivirus serotypes (DEN-1, DEN-2, DEN-3 and DEN-4). Unfortunately, the incidence of dengue fever (DF) and dengue hemorrhagic fever (DHF) has increased thirty-fold globally over the last few decades. In India, unplanned urbanization and migration of population from rural to urban areas with lack of proper sanitation facilities are important factors resulting in increased burden of dengue in recent times (1).

EPIDEMIOLOGY OF DENGUE IN INDIA

The situation in our country is reflected by the occurrence of major disease outbreaks in India over last few years. However, no reliable data are available to assess the exact magnitude of the disease in our country. In fact, many of the smaller outbreaks go unreported. In 1996, the first major outbreak of dengue fever in recent memory occurred in Delhi where more than 10,000 cases and 400 deaths were reported (2,3).

In the last decade, dengue has assumed pan-India proportions. Outbreaks and deaths have been reported from northern states of Haryana, Punjab and Uttar Pradesh; southern states of Andhra Pradesh, Tamil Nadu and Karnataka; western states of Gujarat and Rajasthan; and eastern state of West Bengal. In fact, the case fatality rate has been above 1% over the last 10 years. (4).

The predominant serotype observed in 1996 was DEN-2, whereas all dengue serotypes were detected in 2003 outbreak in north India. However, the outbreak in 2005 in Delhi was mainly due to DEN-3 serotype. The mortality observed in 1996 was far greater than the outbreak in 2003 and possibly can be explained by the difference in the serotypes (DEN-2 is more virulent than DEN-3) (5-9).

It has also been suggested that Aedes aegypti tends to be more susceptible to infection by DEN-2 virus of Southeast Asian genotype as compare to American genotype (10). These observations obviously have important epidemiological implications for Asian countries as the local vector has increased propensity to transmit dengue infection, especially DEN-2 (relatively more virulent serotype).

CLINICAL FEATURES

DF is an acute viral disease manifesting with myalgias, headache, retro-orbital pain, vomiting, maculopapular rash, leucopenia and thrombocytopenia. DHF is characterized by four major clinical features: high fever, hemorrhagic phenomena, hepatomegaly and signs of impending circulatory failure (postural hypotension, resting tachycardia, sweating). The typical laboratory manifestation of DHF is significant thrombocytopenia with concurrent hemoconcentration. The patients of DHF with excessive plasma loss resulting in shock are labeled as dengue shock syndrome (DSS).

The severity of disease in DHF/DSS depends on the quantum of plasma leakage, which is the major pathophysiological abnormality differentiating DF from DHF/DSS. The plasma leakage is due to generalized vasculopathy (hemoconcentration, hypoproteinemia and/or serous effusion) caused by dengue virus. In fact, it is very important to appreciate that platelet count is not predictive of hemorrhage in DHF/DSS (11,12). The risk factors of severe hemorrhage and subsequent mortality are duration of shock and low-normal hematocrit at the time of shock (11). However, the clinician must take into account the potential effect of pre-existing anemia, severe hemorrhage and dehydration while interpreting hematocrit as a manifestation of DHF. DHF/DSS are potentially fatal conditions if managed inappropriately.

The health care personnel should also be aware of the unusual presentations of DF/DHF. The disease may present as acute acalculous cholecystitis, hepatitis, edematous gall bladder wall on ultrasonography, serositis involving pleural and abdominal cavity, fulminant hepatic failure, splenic rupture, acute renal failure or neurological manifestations including intracranial bleeding, seizures and myelitis (13-18). At times, acute acalculous cholecystitis due to DHF may lead to unwarranted surgical intervention with catastrophic bleeding consequences due to thrombocytopenia.

During outbreaks of dengue in India, a good clinical history is still very important so that other common causes of fever like upper respiratory tract infection/urinary tract infection are not overlooked.

MANAGEMENT

Importance of Hydration

There is an urgent need to sensitize the health care personnel regarding the appropriate management principles of DF/DHF. All patients of DF do not need hospitalization. Oral rehydration therapy should be initiated on the first day of the illness in DF as it prevents DHF and decreases risk for hospitalization in
these patients (12,19). It will not be an exaggeration to state that appropriate hydration is the only therapeutic modality that makes the difference between life and death in dengue patients. The use of non-steroidal anti-inflammatory drugs is absolutely contraindicated for control of fever. The patients should be advised paracetamol and/or tramadolol for fever and severe body aches.

“Red Flags”

However, dengue patients with “red flags” or warning signs need to be hospitalized. The two most important warning signs which should never be ignored are inability to maintain hydration due to persistent vomiting and/or abdominal pain. Secondly, the patient must be counseled to observe for hematochezia/melena, which unlike hematemesis may not be noticed by the patient. The other warning signs are bleeding from any site and dizziness/vertigo on getting up from lying down position. However, in our country with very poor oral dental hygiene (chronic gingivitis) in most people, gum bleeding may occur even with mild thrombocytopenia and needs to be considered in proper context rather than cause ‘unwarranted alarm’. In fact, lot of times patients may confuse it with hematemesis, which is a danger sign.

Role of Platelet Transfusion

The unfortunate emphasis on platelet transfusion propagated as a ‘magic potion’ for the management of dengue needs to be understood by the health care personnel, who in turn have to put things in perspective for the general public. Unfortunately, patients as well as health care personnel tend to “chase” platelet counts due to proliferation of “computerized laboratories” with automated ‘coulter’ machines which give almost instant platelet results. Often, the platelet count is underestimated by these computerized machines if they are not manually cross-checked due to the clumping of platelets. In fact, most of these patients are recovering from DF viz. patients are afebrile, appetite is normal and have a feeling of well being, but the platelet count is on the “lower side”.

It needs to be reemphasized that health care providers should not treat platelet count in dengue like ‘sensex’ of the share market viz an increase or decrease ‘reflecting on the economy of the nation’. The focus should to be treat excessive hemoconcentration by hydration and observe for overt bleeding (which is a danger sign irrespective of the platelet count). This “syndrome” of chasing platelet count in dengue patients who are otherwise completely asymptomatic and improving can be labeled as “Dengue panic syndrome” (20).

The flip side of the “dengue panic syndrome” is the overloading of the already strained emergency services of tertiary care hospitals by these patients. Consequently, the “true” DHF/DSS patients needing urgent attention in the emergency may not get the desired care, in spite of the best efforts of the hospital personnel (21). During dengue outbreaks, tertiary care hospitals equipped with ‘platelet cell separator’ machines become the ground zero of all patients. Let us look at the numbers dispassionately. In a metropolitan like Delhi with a population of almost 1.25 crore, if all patients of fever (assuming very conservatively that 0.1% of the population has fever, it translates into 12,500 patients at a point in time) start converging at limited tertiary care centers with ‘platelet cell separator’ machines, it is humanly impossible to accommodate these patients; treatment is obviously a ‘casualty’ in this scenario. The health care personnel in the country need to be sensitized about the treatment protocol (good hydration and paracetamol) in dengue patients so that the referral to tertiary care hospitals is appropriate (22).

The role of replacing platelet transfusion is justified only in patients with active bleeding. Unfortunately, many times empirical platelet transfusions are being given to asymptomatic dengue patients at platelet counts in the range of 30,000/mm³ – 60,000/mm³. We tend to forget that even in thrombocytopenia due to noninfectious etiologies, the threshold for prophylactic platelet transfusion is 10,000/mm³ (23). At the most, it can be suggested that empirical transfusion may be administered in dengue patients without bleeding with a platelet count of less than 20,000-25,000/mm³.

In this context, it is important to remember that empirical platelet transfusion also renders the recipients to the risks of transfusion-related infections, which are in the incubation period and missed on the routine screening tests performed by blood banks. We should remember that ‘Blood is Red and Red is danger’, before administering empirical transfusion of blood products (24). In fact, there is a need for legislation in our country to regulate the use of blood products on empirical basis so that patients are not exposed to potential transfusion-related risks in the long run (22).

In fact, it has been also documented that non-dengue patients receiving multiple transfusions may be alloimmunized to many HLA- and platelet-specific antigens and demonstrate no increase in their post-transfusion platelet count. In dengue patients, this trend may be all the more evident in view of the other factors contributing to thrombocytopenia. Therefore, dengue patients should preferably receive single donor apheresis platelets (SDAP) as compared to random donor platelets (RDP) to lower the risk of alloimmunization (23).

PREVENTION

As of now, dengue vaccine is still in the preclinical stage. Broadly, dengue virus thrives on three factors: mosquito, water and environmental temperature. Environmental temperature is something which is beyond our control. However, we can surely anticipate and tackle the water and mosquito combination on which dengue virus survives in the period August-October (optimal temperature) every year.

George Bernard Shaw once wrote “We learn from history that we learn nothing from history”. In our country, rather unfortunately, this is aptly reflected by the recurrent outbreaks of dengue. Obviously, the core strategy for the reduction in transmission of dengue is the role of community participation and municipal machinery in vector control. Unfortunately, there is no concerted effort to prevent mosquito breeding Aedes aegypti feeds during the day, rests indoors and lays its eggs in artificial water containers. Therefore,
vector control includes simple measures like eliminating larval habitats, using insect repellents/indoor space-spray insecticides/outdoor fogging and mosquito nets for children while sleeping.

In fact, in India we need a national ‘awakening’ program about the sanitation and garbage disposal which result in many infectious diseases like malaria, hepatitis, diarrhea to name a few, besides dengue.

We have to give a clarion call and declare a ‘war’ to clean the cities and villages. As the fear of dengue looms all over, it can be used as an effective foundation to change the mindset of people regarding cleanliness and proper garbage disposal and its health benefits. The municipal authorities have to take this as a challenge to be realized in a time-bound schedule. Hopefully, with the judiciary also becoming proactive in this, things should improve in the long run. Of course, the media has to highlight the advantages of this cleanliness drive with the same zeal as it has reported the dengue outbreak in India.

The other important strategy is to incorporate science while planning our public health policies. The widespread use of chemical insecticides over the years has exposed Aedes mosquito to an intense selection pressure of resistance against these compounds. Therefore, programs will have to be designed to monitor the resistance of Aedes aegypti to insecticides in our country.

In India, we need to concentrate on vector surveillance of not only dengue but also malaria to prevent future outbreaks of these diseases. In fact, in the recent outbreaks of dengue all over India, Aedes Aegypti has been reported from all the affected areas with mosquito breeding indices exceeding 20%. The mosquito index reflects the breeding propensity of the mosquito with a breeding index of more than 10% signifying an impending disease outbreak in that area. Since 1996, dengue control measures have been amalgamated with the Enhanced Malaria Control Programme under the aegis of Directorate of National Vector Borne Disease Control Programme (4).

CONCLUSION

In India, we have to either control the dengue vector or an appropriate referral system has to be devised for the unfortunate victims of this easily preventable scourge. The average total economic burden faced by dengue epidemic in 2006 was estimated to be 27.4 million United States Dollar (USD) or Rs. 125 crores approx (assuming 1USD=Rs 46) (25). No nation can be “wealthy” without a “healthy” population and all our policies need to be oriented to lead the country in the correct direction. As it is said “Where there is a will, there is a way” - what we need in India is an honest will to achieve this.

REFERENCES