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MEDICAL INSIGHTS

Edition-11

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Message From The Editor

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Dear friends,

We are happy to bring you the medical insights magazine after a gap of a few months. The aim of our magazine remains the same as before. One of our aims is to bring to light some interesting and challenging cases managed by our team of doctors at various Ankura branches so that we all can learn from each other. Our other aim is to find answers to difficult questions encountered in the management of common conditions in day-to-day practice. Our magazine therefore aims at both Paediatric Postgraduate students as well as practicing paediatricians.

The first part of the current magazine deals with the complications of chicken pox and the common questions faced in the management of chicken pox. The second part deals with common questions faced in the management of Dengue fever. We chose this topic as we will soon be seeing more cases of Dengue in the coming months. Hope this will be useful for you.

PICTURE QUIZ

- 2-year-old male child
- Presented with H/O high-grade fever and rash for 8 days
- The skin lesions are extremely painful.
- H/O contact with chicken pox in family members
- The pictures of skin lesions are given below (answer in the following article).

VARICELLA GANGRENOSA- A RARE COMPLICATION OF CHICKEN POX

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PRESENTING SYMPTOMS

- 2-year-old male child
- Presented with H/O fever and rash for 8 days.
- Unable to bear weight on the right leg.
- Skin lesions are extremely painful.
- H/O contact with chicken pox in family members.

EXAMINATION FINDINGS

- Continuous high-grade fever with chills
- Multiple skin lesions- vesicles, blisters, scabs Later progressed to ulcers and necrotic areas
- Right thigh warm, red, tense, and tender

INVESTIGATIONS

- CRP- 214
- WBC, Clotting screen- normal
- HIV screening-negative
- Fluid from blisters- heavy growth of Staph aureus
- USG thigh- suggestive of cellulitis

DIAGNOSIS AND MANAGEMENT

Given the above findings, a diagnosis of Varicella gangrenosa was made and the following treatment was given:

- Supportive treatment- IV fluids, antipyretics, analgesia.
- Specific treatment- IV acyclovir, IV antibiotics (anti-staphylococcal).
- Topical treatment- antibiotic creams, hydrogen peroxide.
- Surgical debridement of necrotic areas was planned if the child was not improving.

PROGRESS

Lesions seemed to worsen initially with necrotic lesions and scab formation. However, the fever improved after 5 days, and the lesions gradually improved over the next 4 weeks. Progress depicted in the below pictures:

After 1 week

After 4 weeks

DISCUSSION

Varicella gangrenosa is a rare complication of varicella infection. It is caused due to gangrenous ulceration of varicella lesions and superimposed bacterial infections. The common organisms involved include beta-hemolytic streptococci and Staph aureus.

There are 3 variants

- Wet gangrene type (due to superimposed bacterial infection)
- Dry gangrene type (due to arterial thrombosis)
- Purpura fulminans (associated with thrombocytopenia, bleeding)

Early administration of IV acyclovir and systemic antibiotics is essential in managing this condition. Removal of the thick adherent crusting or granulation tissue by medical or surgical means can aid in faster healing. Survival is dependent on early diagnosis and adequate aggressive treatment. It frequently occurs in immunocompetent children and extensive workup for immunosuppression is usually not required.

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OSTEOMYELITIS OF THE DISTAL RADIUS FOLLOWING CHICKENPOX

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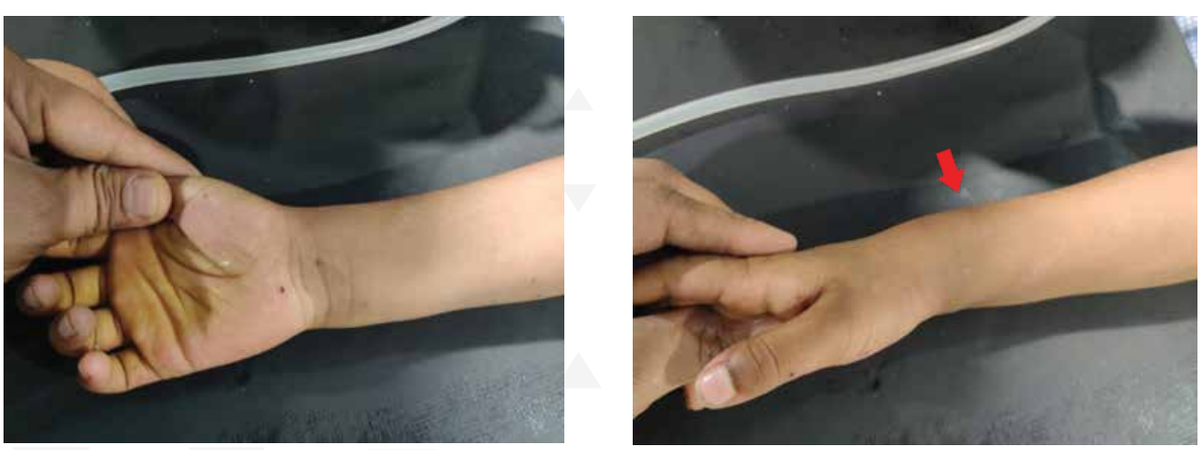
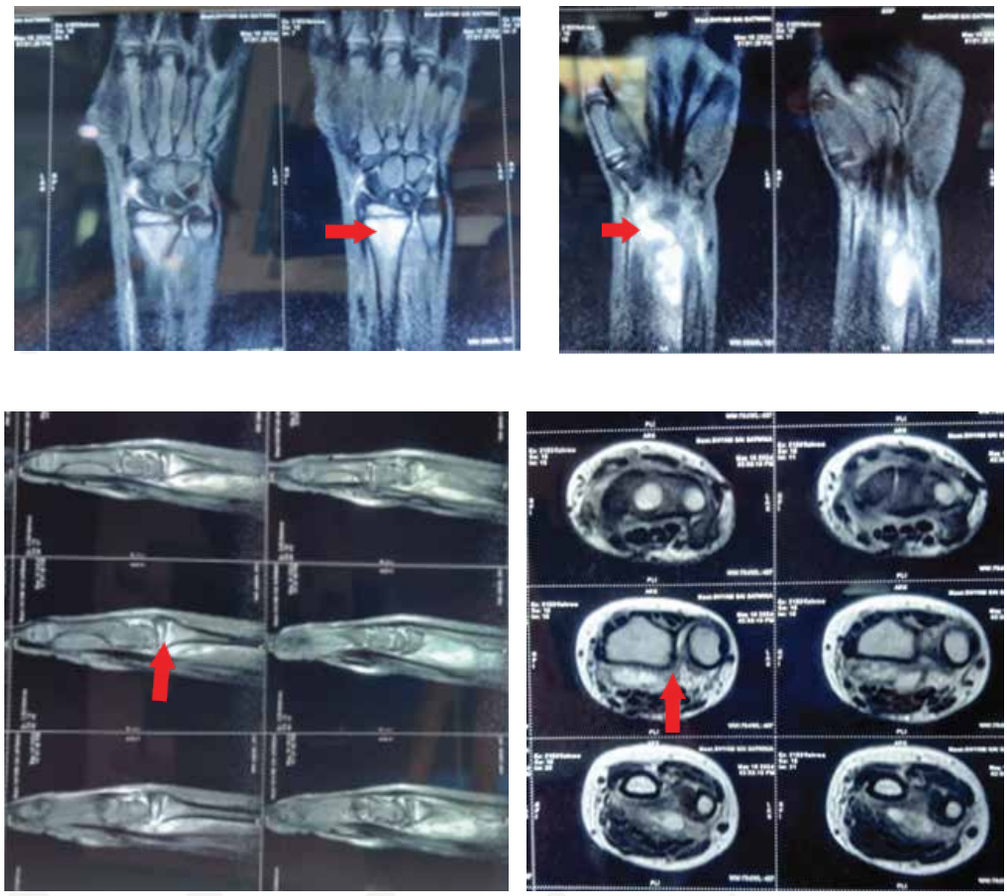
CLINICAL PRESENTATION

The patient, a previously healthy 5-year-old child, presented with swelling of the entire forearm with local rise of temperature, and tenderness. This was diagnosed as cellulitis and treated with broad-spectrum IV antibiotics. After 5 days, swelling of the forearm subsided. However, wrist swelling persisted with pain and restricted supination and pronation. The symptoms began approximately two weeks after a confirmed diagnosis of chickenpox. Initial evaluation revealed localized tenderness over the distal radius with overlying erythema and warmth.



Pic 1 & 2: Swelling of the wrist. Healing chicken pox lesions

Pic 3: X ray showing lytic lesion in the distal radius



Pic 4-7: MR images showing hyperintensities in distal radius metaphysis with subperiosteal collection on the volar aspect.

DIAGNOSTIC JOURNEY & TREATMENT

Upon suspicion of septic arthritis/osteomyelitis of distal radius, imaging studies were conducted. A plain X-ray revealed a distal radius lytic lesion in the metaphysis adjacent to the physis. MRI was suggestive of acute osteomyelitis with subperiosteal abscess. In the operating theatre, the distal radius was approached anteriorly. Around 3ml of the seropurulent collection with physeal separation of distal radius was noted. The pus was drained, and debridement was performed. To minimize the chances of a physeal bar, forearm subcutaneous fat was harvested and placed at the physeal region. After a thorough washout and intramedullary decompression, the wound was closed over a drain. Pus culture analysis confirmed the presence of Streptococcus pyogenes. The source of osteomyelitis could originate either from local spread, where cellulitis extends to the wrist joint, or from hematogenous spread secondary to compromised immunity following a recent chickenpox infection. Culture-specific antibiotics IV Amoxycillin and clavulanic acid were started and wrist splinted for 4 weeks with a below elbow cast. The multidisciplinary team ensured aggressive management of pain and inflammation while closely monitoring for systemic complications of the infection.

Pic8 : Sero Purulent collection

Pic 9: Physeal separation

Pic 10, 11: Fat grafting over physis to prevent bar formation

Pic 12: Follow up x-ray showing resolution of infection

MANAGEMENT CHALLENGES

The management of osteomyelitis in children poses unique challenges due to the potential for rapid bone destruction and growth plate involvement. Close follow-up with serial imaging was crucial to monitor physeal integrity and guide rehabilitation efforts postoperatively.

LONG-TERM IMPLICATIONS

Despite the prompt intervention, this child has a risk of potential long-term consequences, including growth disturbances or premature physeal closure. Rehabilitation efforts focused on preserving the range of motion and preventing secondary contractures, emphasizing the importance of early physiotherapy and ongoing orthopedic follow-up.

CONCLUSION

This article underscores the potential complications associated with common childhood infections. Clinicians should maintain a high index of suspicion for unusual presentations following viral illnesses, particularly in the context of cellulitis, not subsiding with antibiotics. Multidisciplinary collaboration is essential for optimizing outcomes and minimizing long-term sequelae in such complex cases.

CHICKENPOX IN CHILDREN- FAQS

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WHEN SHOULD WE GIVE VARICELLA VACCINATION IN CHILDREN?

In children, two doses (0.5 ml each) of varicella vaccine are given subcutaneously, separated by at least three months. Vaccination reduces the occurrence of chicken pox infection in infancy and zoster in later life. It also reduces the occurrence of severe disease.

The first dose should be given after 12 months (doses given before 12 months are not considered valid). Thus, the IAP recommends the first dose at age 15 months and the second at age 18-19 months. The CDC recommends administering the first dose between the ages of 12 and 15 months and the second between 4 and 6 years.

HOW EFFECTIVE ARE VARICELLA VACCINES?

Studies in the United States have shown that a single dose of varicella vaccine provided moderate protection (82%–85%) against varicella of any severity and high protection (100%) against severe varicella, with some waning of the protection over time. Two doses of the varicella vaccine improved the vaccine's effectiveness by at least 10% against varicella of any severity, with no waning of effectiveness over time [1]. Studies have also shown that children who received two doses of the varicella vaccine produced antibodies for at least 10 to 20 years after vaccination [2].

CAN CHILDREN DEVELOP CHICKENPOX AFTER VACCINATION?

Milder breakthrough infection can occur, especially in children who have received a single dose.

WHEN SHOULD ANTIVIRALS BE GIVEN FOR VARICELLA INFECTION IN CHILDREN?

Antiviral (acyclovir) is indicated in varicella infection in below cases:

- Preterm and neonates under one week
- Adolescents above 12 years of age
- Children with chronic cutaneous and pulmonary disorders
- Secondary cases among household contacts (more severe disease)
- Severe and complicated infections
- Children on salicylates and oral steroids
- Immunocompromised children (primary or secondary immunodeficiency)

Valacyclovir may be administered in place of acyclovir for children above age two as the safety and efficacy of the former has not been established in children under the age of two.

WHEN IS IV ACYCLOVIR INDICATED?

- Premature neonates and term neonates <7 days of age
- Severe and complicated infections
- Immunocompromised children (IV Acyclovir for 7 to 10 days)

HOW EFFECTIVE IS ACYCLOVIR IN CHILDREN?

A Cochrane review of acyclovir for chickenpox in healthy children and adolescents suggested that acyclovir effectively reduces the number of days with fever and the maximum number of lesions. The clinical importance of acyclovir treatment in otherwise healthy children remains uncertain.

SHOULD WE GIVE A VACCINE AFTER A NATURAL INFECTION?

A prior history of varicella is not a contraindication to varicella vaccination, so the varicella vaccine should be administered when there is doubt.

HOW DO WE TREAT HOUSEHOLD CONTACTS?

- The vaccine can be given to household contacts above one year of age if presenting within five days of exposure.
- Immunodeficient contacts should receive VZIG.
- Oral Acyclovir can be given in secondary cases of household contacts, as these are usually more severe.

IS IT COMMON FOR CHILDREN TO HAVE COMPLICATIONS?

Complicated varicella usually occurs in immunocompromised and unvaccinated children. The following complications might arise in varying incidences.

- Skin: secondary bacterial infections (mainly group A Streptococcus and Staphylococcus aureus) leading to impetigo, abscess, cellulitis, etc.
- CNS: Cerebellar ataxia (1 in 4,000 cases of unvaccinated children), Encephalitis (1 in 50,000 cases of unvaccinated children), Aseptic meningitis, Transverse myelitis, Guillain Barre syndrome
- Pneumonia: can cause primary varicella pneumonia or secondary bacterial pneumonia
- Renal: HUS, Nephritis, Nephrotic syndrome
- CVS: Pericarditis, Myocarditis
- Bones: Osteomyelitis, Septic Arthritis
- Progressive varicella: Seen in severely immunocompromised
- Thrombocytopenia: Seen in 1–2%; mild and rarely complicated with hemorrhage
- Herpes zoster
- Others: pancreatitis, orchitis, hepatitis, Reye syndrome

WHICH CHILDREN ARE AT HIGHER RISK FOR THESE COMPLICATIONS?

- Preterm babies and Infants
- Immunodeficient children (primary or secondary immunodeficiency)
- Adolescents and adults (unimmunized)

HOW CAN THESE COMPLICATIONS BE PREVENTED?

- Vaccination
- Ensuring adequate skin hygiene during infections
- Post-exposure prophylaxis with Varicella zoster immunoglobulin in selected cases

WHAT ARE THE INDICATIONS FOR VARICELLA ZOSTER IMMUNOGLOBULIN (VZIG)?

VZIG is indicated as post-exposure prophylaxis within 96 hours of exposure in the following cases:

- Immunocompromised children
- Newborn baby exposed to maternal varicella (5 days before to 2 days after delivery)
- Varicella in the first 20 weeks of pregnancy.

WHEN CAN CHILDREN GO TO SCHOOL AFTER VARICELLA INFECTION?

Children with chickenpox are infectious from 2 days before the appearance of the rash until the vesicles are crusted over. Therefore, children can return to school once all the lesions have crusted.

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DENGUE FEVER IN CHILDREN – WHAT ALL PAEDIATRICIANS NEED TO KNOW

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We are again coming to the part of the year when there will be a dengue epidemic. We would like to share our experiences in the management of the disease with fellow paediatricians.

WHAT ARE THE EARLY SIGNS OF DENGUE AND HOW IT IS DIFFERENT FROM OTHER VIRAL FEVERS?

To start with Dengue fever is like any other viral fever. The things that can differentiate Dengue from other viral fevers are the sudden onset of high fever, of about 103–105°F, associated with severe headache, pain behind the eyes, severe joint and muscle pain, exhaustion, facial flushing, rash over the body, nausea, or vomiting, bleeding manifestations. The symptoms can last for over 5–7 days. This can happen in normal viral fever also but in Dengue the exhaustion and joint pain are very severe and children look sick even when the fever is not present.

WHAT ARE THE AVAILABLE TESTS FOR THE DIAGNOSIS OF DENGUE?

NS1 Antigen Detection- becomes positive within 7 days of onset of fever.

IgM antibodies-becomes positive after 7 days

The above tests done by ELISA method confirm the diagnosis of Dengue fever.

CAN DENGUE FEVER BE TREATED AT HOME?

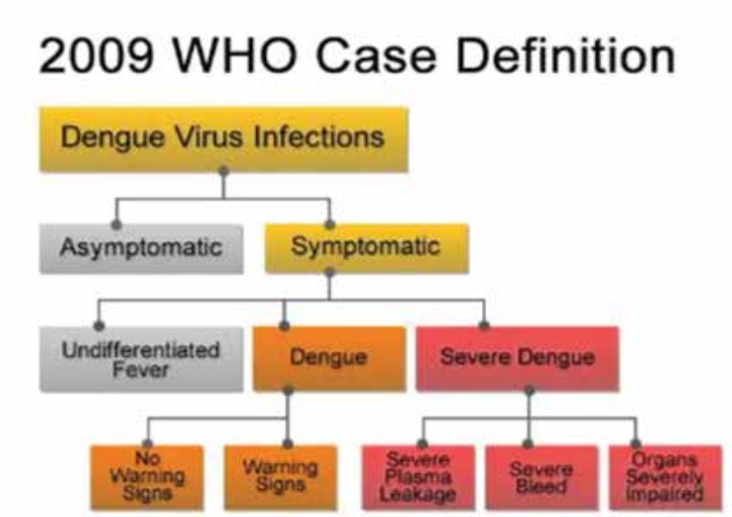
Most patients with dengue fever can be treated at home. They should take rest, drink plenty of fluids, and maintain a nutritious diet. Taking plenty of fluids is very important and prevents the complications of Dengue fever.

Fever should be treated with antipyretics and antibiotics are not required.

WHEN SHOULD WE ADMIT THESE CHILDREN TO THE HOSPITAL?

Children with Dengue fever can be asymptomatic, symptomatic, or have severe Dengue.

Symptomatic children may or may not have warning signs. Children with warning signs and severe Dengue should be admitted to the hospital.



The **warning signs** are:

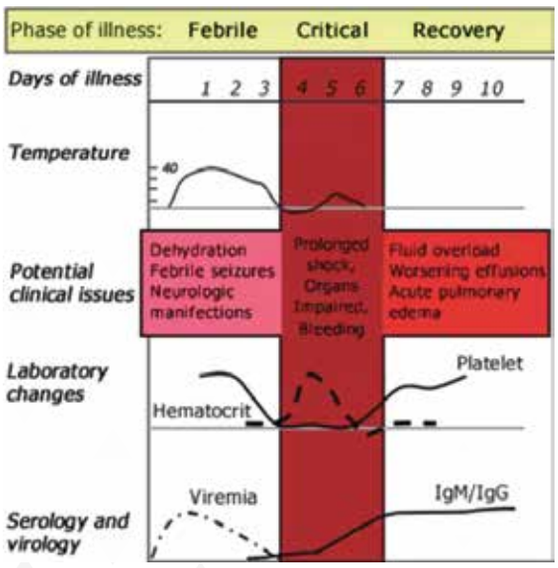
- Severe abdomen pain or tenderness
- Persistent vomiting, decreased urine output
- Clinical fluid accumulation (ascites, pleural effusion)
- Mucosal bleeding
- Lethargy or restlessness
- Liver enlargement > 2 cm
- Raising haematocrit concurrent with falling platelet counts

The features of **severe Dengue** are:

- Severe plasma leakage (leading to shock or respiratory distress)
- Severe bleeding
- Severe organ involvement (liver, heart, CNS)

WHAT IS THE MOST IMPORTANT ASPECT OF THE TREATMENT OF DENGUE?

The clinical course of dengue has 3 phases: febrile, critical, and recovery phases. The fluid management depends on the phase of illness. The potential clinical issues and laboratory findings at various phases are illustrated below. Fluid management in admitted patients is probably the most important aspect of Dengue treatment.

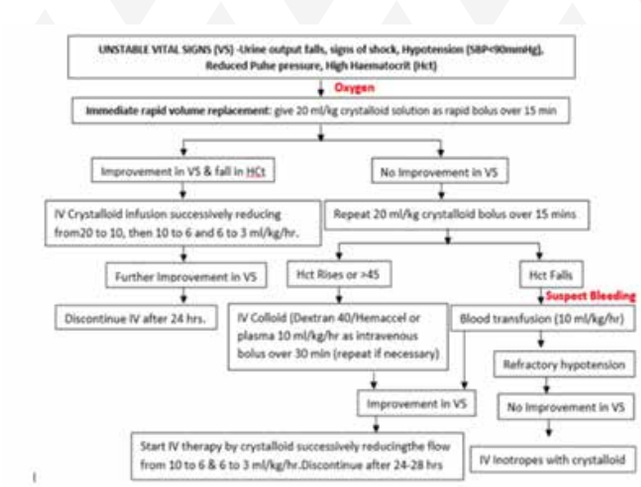


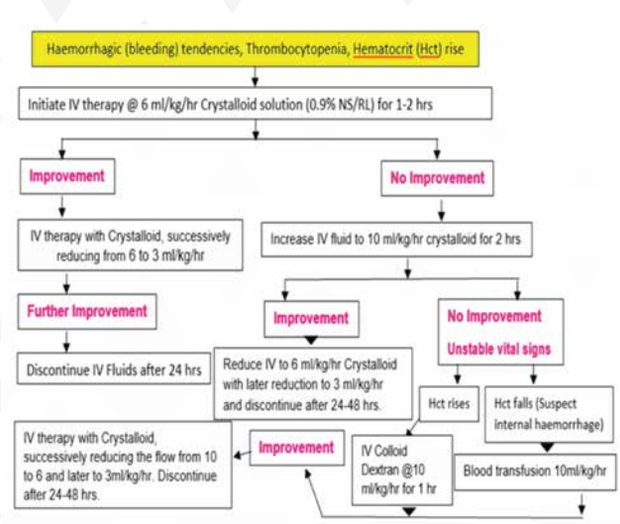
WHAT ARE THE PRINCIPLES OF FLUID MANAGEMENT FOR DENGUE IN CHILDREN?

Fluid management depends on the phase of illness and the clinical progress of the patient.

Febrile phase- the aim is to treat dehydration like any other viral illness giving 2/3rd to full maintenance depending on the hydration state and oral intake of the child.

Critical phase- usually starts 24 to 48 hours after the fever subsides and is associated with an increase in capillary permeability and leakage of fluid. Those with severe plasma leakage will develop severe dengue whereas those without recover from the illness. The below flowcharts give steps in the management of severe Dengue.





The principles of management include treatment of shock, maintaining effective circulation for 24–48 hours, correction of metabolic and electrolyte disturbances, and blood transfusion in cases with severe bleeding.

Usually, crystalloids either NS or Ringer's lactate are usually enough for the treatment of shock. Only in the cases of severe or refractory shock, do we use colloids like albumin. The assessment of the inferior vena cava by bedside ultrasound has emerged as a very good tool for titrating the fluids.

In the management of shock, we should aim for minimal circulating volume, low-normal BP and perfusion, and urine output of 0.8-1ml/kg /hr. If fluid infusion rates remain high, consider a brief period of vasoactive agents.

Recovery phase - management consists of weaning the IV fluids and encouraging oral fluids. Fluid overload with its complications can occur if not managed properly in this phase.

WHAT IS THE ROLE OF HCT IN THE MANAGEMENT OF FLUIDS?

Fluid management should be monitored very carefully in Dengue as both insufficient and excess fluids can cause problems. Excess fluids can lead to hypervolemia, which can cause edema, respiratory distress, abdominal compartment syndrome, and can exacerbate the shock. Hence monitoring of haematocrit plays a vital role in titrating the fluids. If the patient has refractory shock with increasing HCT, give colloids. If the patient has refractory shock with decreasing HCT, give whole blood or PRBCs. The below pictures illustrate the interpretation of haematocrit and subsequent management.

Interpretation of rising or persistently high Haematocrit					
Haematocrit		Vitals		Interpretation	Action
A rising or persistently high Haematocrit	+	Unstable vital signs	=	Active plasma Leakage	Need for further fluid replacement
A rising or persistently high Haematocrit	+	Stable Haemodynamic status	=	Does not require extra intravenous Fluid	Continue to monitor Closely. HCT should start to fall within next 24 hours as plasma leakage stops.

Interpretation of a decrease in Haematocrit					
Haematocrit		Vitals		Interpretation	Action
A decrease in Haematocrit	+	Unstable vital signs	=	Major haemorrhage	Need for urgent Transfusion
A decrease in Haematocrit	+	Stable haemodynamic status	=	Haemodilution and/ or reabsorption of extravasated fluids	IV fluids should be reduced in step-wise manner or discontinued immediately to avoid pulmonary oedema

WHEN SHOULD PROPHYLACTIC PLATELETS BE GIVEN IN CHILDREN WITH THROMBOCYTOPENIA?

Platelet count usually decreases during illness and will spontaneously improve during the recovery phase. The risk of bleeding in Dengue depends upon the associated shock, acidosis, and fluid overload. If these are normal, then the chances of bleeding are minimal even with low platelet counts. Therefore, prophylactic platelet transfusions for severe thrombocytopenia in otherwise hemodynamically stable patients who do not have clinically significant bleeding are not necessary.

HOW DO I REMOVE EXCESS FLUID FROM THE CHILD?

Firstly, preventing fluid overload by using judicious fluid management is important. Diuretics should not be used during the critical phase. The various ways to remove the excess fluid are:

- Diuretic infusions (during the hemodynamically stable period)
- Peritoneal and pleural drains/ dialysis especially if there is abdominal compartment syndrome
- CRRT (Continuous renal replacement therapy)
- SLED (sustained low- efficiency dialysis)

We should not forget that Dengue is a disease of capillary leak and not thrombocytopenia. Hence fluid optimization and a close eye on the fluid status (vitals, haematocrit, and urine output) is the most important aspect of successful treatment of the disease.

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