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QUICK  
FACTS  
FOR TEENS

**Hydroxyurea Therapy for Sickle Cell Disease**

FOR EDUCATIONAL PURPOSES ONLY

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### 1. What is Hydroxyurea?

Hydroxyurea or, HU is an old anti-cancer medicine approved by the Food and Drugs Authority, FDA-USA for the treatment of Sickle Cell Anaemia, that is, persons with the SS type of sickle cell disease. Hydroxyurea can be used in both children from the age of 9 months and adults with sickle cell anaemia. Hydroxyurea is mainly available as capsules. Currently, the capsules are used to prepare suspensions for children by pharmacists under sterile conditions in a manufacturing process called compounding.

### 2. How does Hydroxyurea work to control Sickle Cell?

Hydroxyurea provokes (or stimulates) the production of healthier (that is, almost normal, round and flexible) red blood cells that have high foetal haemoglobin levels from the bone marrow. These cells do not sickle (clog or clot) as often and live longer, unlike the abnormal sickle cells. Consequently, when used properly, hydroxyurea results in no bone pain; no life-threatening chest pain (called acute chest syndrome); higher haemoglobin levels; no need or reduced need for frequent blood transfusions; and hence reduced hospital admissions.

### 3. I feel well. Why should I take Hydroxyurea?

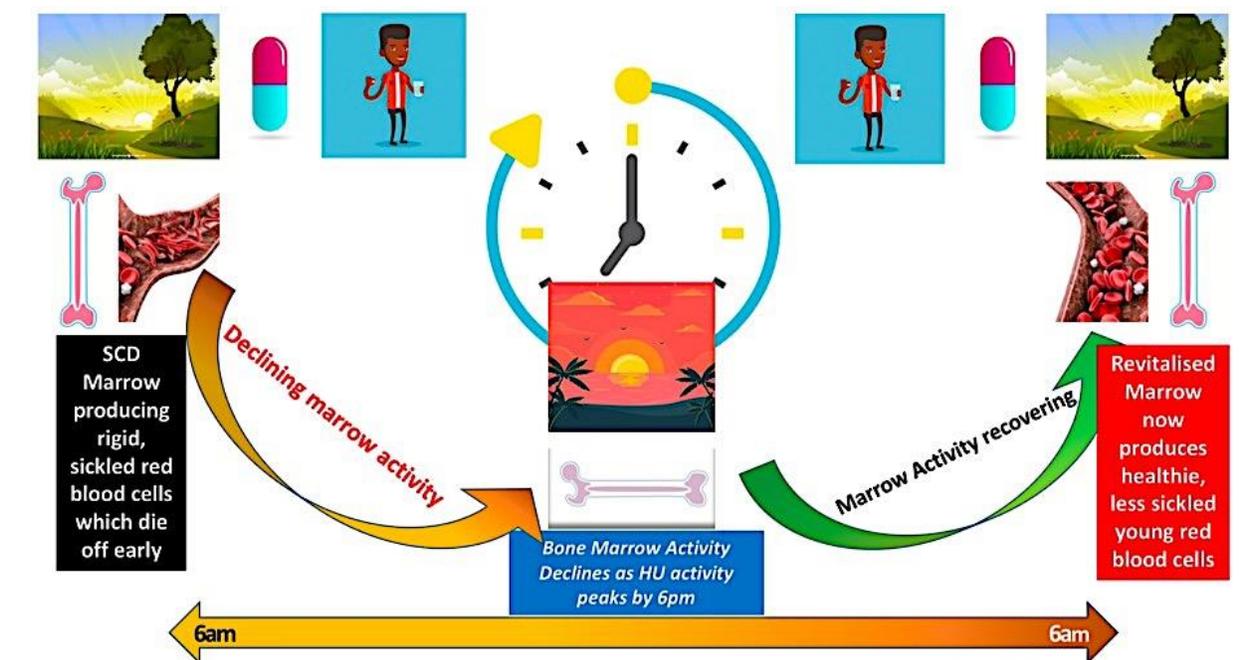
It is important that you feel well in your body all the time and not experience any sickle cell pain regardless of severity at all. Your various blood components including white blood cells ( ‘ soldiers ’ ), platelets ( ‘ glue ’ ), and the haemoglobin (red pigment that carries oxygen) must also be regulated to safe levels within your body always. Sickle cell can lead to unpredictable life-threatening consequences if these are not well regulated. Hydroxyurea treatment which is well done helps to ensure that you feel well all time while reducing your risk of coming down with the unpredictable life-threatening effects.

### 4. Will Hydroxyurea replace the penicillin and folic acid pills that I am already taking?

No. Each of the three medicines has a specific role. Penicillin prevents life-threatening bacterial infections while folic acid is an essential supplement needed by your body to produce red blood cells. Hydroxyurea does not provide your body with these essential functions as it has its specific roles described above.

### 5. How is hydroxyurea taken?

Hydroxyurea is taken by mouth, once a day - every 24 hours more appropriately. The dose depends on your weight at the time of prescribing and your blood counts. Your dose will be increased steadily for the first six months of hydroxyurea therapy guided by a protocol (see “what is a protocol?” below). And depending on your blood counts you may be asked to suspend therapy for a while and/or have your dose reduced.



*Figure 1: Illustration of the Mechanism of Action of Hydroxyurea*

Hydroxyurea works well by the clock. For example, at sunrise (6am) when a capsule of HU is swallowed, the concentration of the drug builds up gradually in your body and it exerts its maximum effect on the bone marrow (blood cell factory) by 6pm. The bone marrow then begins to recover for the next 12 hours. In doing so it produces healthier (less rigid, rounder, flexible) young red blood cells which live longer in blood and result in the combined beneficial effects of hydroxyurea.

#### 6. What is a protocol?

This is a set of strict guidelines including blood count targets and instructions of dosing to guide your therapy. The protocol for instance, will contain information on when to increase change your dose; suspend treatment; undertake blood counts; schedule the next visit; etc. to guide practitioners in starting and monitoring your treatment.

#### 7. How can I tell if the hydroxyurea therapy is working for me?

You most likely to notice the benefits of hydroxyurea by the end of your third month of appropriate therapy. As previously discussed, you are likely to experience significant reduction in the episodes of bone and life-threatening chest pain; reduction in the number of hospital admissions and/or visits to the emergency department; and a decrease in the need for blood transfusions.

Your regular complete or full blood counts will also give you an indication of how well you are doing on hydroxyurea. Generally, look out for a decrease in total white cell count to a target of 4 – 10; and an increase in haemoglobin levels to a target of 10 – 12. Your doctor will assist you to understand these and other parameters.

#### 8. What changes or trends in the “counts” or lab results should I expect?

Generally, I advise you to look at the following trends: Increasing Hb levels; Decreasing WBC counts (from previous highs); Increasing Mean Cell Volumes, (MCV) or sizes of the red cells. The MCVs especially, significantly increase and appear abnormally high which indicate to us that one has truly been getting adequate amounts of HU into his or her bloodstream or body.

See the “follow your count” chart at the end of this booklet. Ask your nurse to assist you to complete the chart on each clinic visit. Don't forget to indicate any pain episodes you experience in between visits.

#### 9. What are the side effects of Hydroxyurea?

1. Hydroxyurea is generally safe from the age of 9 months. Some individuals may experience nausea and/or vomiting and some abdominal discomfort at the start of therapy which later resolves. We usually recommend that adolescents and adults, consider taking their pills bed time. These symptoms do not appear during sleep.
2. Hydroxyurea can potentially lower your blood counts. This can result in you being prone to infections and/or bleed. Thankfully, your doctors can identify these on your full blood count reports before they manifest physically. Once identified you will be asked to temporarily suspend therapy till such a time that your medical team deems it safe for you to continue therapy. We use the protocol to strictly guide therapy to predict these side effects.
3. Hydroxyurea can theoretically increase the risk of miscarriage, birth defects, restricted foetal growth, or postnatal development. There are reported cases where women on hydroxyurea who got pregnant while on treatment delivered normal babies. In spite of its safety profile in sickle cell disease, we strongly recommend that hydroxyurea is not taken at any time during pregnancy.
4. In males, hydroxyurea can lower sperm count. However, this does not decrease to levels that cause infertility. Hydroxyurea does not affect the quality of the sperms.

#### 10. What if I get pregnant while taking hydroxyurea?

While on hydroxyurea it is advisable for both genders to use appropriate contraceptives to prevent any unplanned pregnancy. Should pregnancy be desired or occur, consult your medical team immediately. As a precaution, hydroxyurea must be suspended for three months before conceiving.

#### 11. Does hydroxyurea work for all persons with sickle cell?

A small group of people may not derive the expected benefits of HUT. This is called treatment failure. We can only know if there is treatment failure when a person has stayed on the protocol with close monitoring for at least 6 months with no proven expected benefits.

#### 12. How often will I need to see the doctor?

For the first 6 months there is a stipulated schedule of hospital visits per the protocol till you reach your maximum dose. Then you will be followed up every 3 months.

#### 13. Will I need to do a laboratory test each time I visit the doctor?

Yes. You will be expected to do a complete blood count test at least for each visit and a pregnancy test if you are female of reproductive age. Other tests including scans will be ordered as required.

#### 14. What should I do if I am not feeling well and my visit date is not due?

Whether you are taking hydroxyurea or not, report to the nearest health facility when you notice any of the following:

- 👤 Feeling unusually tired and/or dizzy and/or panting unusually (**dangerously low haemoglobin**)
- 👤 Urine appears dark with or without worsening jaundice (**abnormal breakdown of red blood cells**)
- 👤 Any chest pain or tightness with or without shortness of breath and cough (**acute chest syndrome**)

- 📌 Any fever (**possible life-threatening bacterial infection**). It is important to start antibiotics early. Take your crash pack of oral antibiotics if you cannot reach the facility **within one hour**.
- 🧠 Headaches – unusual, not attributed to stress nor responding to pain killers (**stroke**)
- 📏 Increase in your tummy size; especially of a new swelling or an increase in size of previously small swelling on the left side of your tummy (**enlargement of the spleen**)
- 🩸 Any bleeding or pale appearance or fever if taking hydroxyurea (**hydroxyurea toxicity**)
- ♀ Missed period or planning to get pregnant if you are taking hydroxyurea (**potential effect on baby**)

## Follow Your Counts Chart

**FOLLOW YOUR COUNTS: HUT Monitoring Flow Chart**

Date of Visit	Visits (Indicate Routine and Sick)	WBC Count (Total) <i>(x 10<sup>9</sup>/L)</i>	ANC <i>(x 10<sup>9</sup>/L)</i>	Haemoglobin, Hb <i>(g/dL)</i>	Mean Cell Volume, MCV <i>(fL)</i>	Platelets Count <i>(x 10<sup>9</sup>/L)</i>	Retic Count (Absolute) <i>(x 10<sup>9</sup>/L)</i>	Current Weight <i>(kg)</i>	HU Dose <i>(mg/kg)</i>	HU Dose <i>(mg)</i>	Next Visit (Date)	Purpose of Next Visit

*Purpose of Next Visit: Dose Escalation; Count Check; Follow up on toxicity; etc.; Other Tests: Pregnancy Test (if applicable); Hb F and F Cells (where available); WBC: White Cell Count; ANC: Absolute Neutrophil Count*

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