Effective Health Care

Alternative Treatments for Sickle Cell Disease
Nomination Summary Document

Results of Topic Selection Process & Next Steps

- The topic, *Alternative Treatments to Blood Transfusion for Treatment of Sickle Cell Disease*, could potentially be considered for new research in comparative effectiveness.

Topic Description

Nominator(s): Individual

Nomination Summary: In the US, sickle cell disease (SCD) constitutes a significant source of morbidity and mortality, and predominantly affects African-Americans. SCD patients may require frequent hospitalizations for stroke and acute chest syndrome, events for which blood transfusions are one principal treatment. However, chronic transfusions may expose patients to rare, but serious complications such as hemosiderosis, infection and allo-immunization.

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Population(s): Patients with sickle cell disease (SCD) including sickle cell anemia, HbSC disease and HbS/β0 thalassemia variants.

Subpopulations: Pre-surgical, pregnant SCD patients

Intervention(s): Alternatives to blood transfusions including: hydroxyurea, bone marrow transplant, gene therapy, and plant derived medications—such as herbal plants (telfaria occidentalis, and solanum leaves)

Comparator(s): Blood transfusions

Outcome(s): Reduction in frequency or severity of vasoocclusive events such as: pain crisis, acute chest syndrome (ACS), stroke; hospitalizations, quality of life

Key Questions from Nominator: The nominator inquired about alternatives to blood transfusion to treat anemia in SCD patients with a particular focus on the comparative effectiveness of herbal plants (telfaria occidentalis and solanum leaves) and in the context of pregnancy.

Considerations

- The topic meets Effective Health Care (EHC) Program appropriateness and importance criteria. (For more information, see http://effectivehealthcare.ahrq.gov/index.cfm/submit-a-suggestion-for-research/how-are-research-topics-chosen/.)

- Sickle cell disease (SCD) is caused by inheritance of a mutated sickle cell gene for hemoglobin
- SCD patients experience a wide variation in clinical course and severity. However, characteristic clinical manifestations include acute pain crises (often requiring hospitalization and analgesia), increasedsusceptibility to bacterial infections, acute chest syndrome (ACS) and stroke.
- Aside from analgesic strategies used to treat pain crises, the mainstay of treatment for SCD consists of hydroxyurea (HU) and blood transfusions. Transfusion therapy is the standard of care for stroke prevention in SCD and is commonly used for treatment in other contexts such as acute chest syndrome (ACS) and multi-organ failure. Transfusion is also used in pre-surgical and pregnant SCD patients.
- There are significant concerns over risks which accrue with long term transfusion therapy, including iron overload/hemosiderosis, blood borne infections (such as hepatitis), problems with venous access and allo-immunization. However, there is limited evidence available on alternative treatments for the management of SCD.

Existing Evidence

- A search of the literature identified a 2008 AHRQ EPC Evidence Report/Technology Assessment from on hydroxyurea for the treatment of sickle cell disease, which concluded that hydroxyurea (HU) provides benefit for children and adults with SCD.
  - Segal JB, Strouse JJ, Beach MC, et al. Hydroxyurea for the treatment of sickle cell disease. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Feb. 298 p. (Evidence report/technology assessment; no. 165).
- Although phytomedicines represent a promising avenue of research, the literature search identified only two trials which examine the efficacy of these plant-derived drugs. The search also identified a relevant Cochrane systematic review on phytomedicines, which included these same two trials. At present neither Nix-0699 (Niprisan) or Ciklavit has received FDA approval for use in the US.
  - Oniyangi O, Cohall DH. Phytomedicines (medicines derived from plants) for sickle cell disease. Cochrane Database Syst Rev 2010;(10):CD004448. PMID: 20927735
- The National Heart, Lung, and Blood Institute (NHLBI) at the National Institutes of Health (NIH) is developing an updated guideline on the management of SCD to be published in late spring/early summer 2013 (http://www.nhlbi.nih.gov/guidelines/scd/). The guideline will feature a chapter on HU but it is unknown if phytomedicines will be discussed in the guideline.