Sulfonamides

Sulfonamides are a category of broad-spectrum antimicrobial drugs that work by inhibiting folic acid synthesis, which interferes with bacterial proliferation.This type of medication is usually indicated to treat a urinary tract infection; however, the provider must carefully consider the patient’s allergies before prescribing. Side effects of sulfonamides include crystalluria, photosensitivity, rash, anemia, and kernicterus. Patients should be encouraged to drink plenty of fluids when taking sulfonamides, in order to prevent renal damage.



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Mechanism of Action

Bacteriostatic

Bacteria-shocked

Sulfonamides act as a competitive inhibitor to the initial reaction necessary for the synthesis of folic acid to occur. When folic acid synthesis is suppressed, bacteria are unable to create DNA, RNA and proteins, ultimately interfering with bacterial proliferation. Sulfonamides are considered bacteriostatic; however, meaning that the host’s immune system is needed, in combination with these drugs, in order to completely resolve the infection.

Indications

Urinary Tract Infection

Urinary-tract-on-fire

The use of sulfonamides is usually limited to the treatment of urinary tract infections, due to the increased risk of sulfonamide resistance, and the availability of other, less harmful, antibiotics. Despite their limited scope of use, these drugs are still preferred for the treatment of urinary tract infections; the majority of urinary tract infections are caused by Escherichia coli, a sulfonamide-sensitive bacterium. Sulfonamides are particularly effective when prescribed in conjunction with trimethoprim (TMP).

Side Effects

Crystalluria

Crystal-urinal

Crystal formation in the kidneys and/or ureters is a potential side effect due to the low solubility of sulfonamides. Patients with renal damage or those who are in renal failure should not take these drugs due to the potential for further kidney damage. To decrease the risk of developing crystalluria, patients should consume eight to ten glasses of water each day.

Photosensitivity

Photo-camera causing Sensitive-tears

This is a common side effect that develops with sulfonamide use. Patients should limit their sun exposure, in addition to wearing protective clothing, and sunblock to help minimize sensitivity.

Hemolytic Anemia

Hemolysing-RBCs from Anemone

Excessive lysis of red blood cells can lead to hemolytic anemia, a condition in which there is a decreased or insufficient number of functioning red blood cells. Patients should be educated about the signs and symptoms of this condition, including fever, pallor and yellowing of the skin. Sulfonamides can also cause hematologic conditions such as agranulocytosis, leukopenia, thrombocytopenia and, in rare cases, aplastic anemia.

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Kernicterus

Colonel

In newborns, bilirubin, a byproduct of heme breakdown, is bound tightly to plasma proteins in the blood. The use of sulfonamides in newborns can disrupt the bond between bilirubin and plasma proteins, causing an increase in free, unbound bilirubin. When bilirubin is freed from plasma proteins, it can travel across the blood brain barrier and into the central nervous system where it can cause severe neurologic damage, and death. Sulfonamides should not be given to infants less than two months old. Also, the drug should not be administered to pregnant women near term or mothers who are breast feeding.

Rash

Rash

A potentially life-threatening condition known as Stevens-Johnson Syndrome can develop with use of sulfonamide drugs. This hypersensitivity reaction can lead to widespread skin lesions and cell death. Initial symptoms of the syndrome include fever, sore throat and fatigue, which can be mistaken for an infection. Patients should be taught to stop taking sulfa medications if a rash occurs, and to immediately contact their healthcare provider.

Considerations

Sulfa Allergy

Sulfur-match Allergy-alligator

Patients who experience a hypersensitivity/allergic reaction to sulfonamide drugs may also react adversely to drugs containing sulfonamide components such as thiazide, loop diuretics, or sulfonylurea oral hypoglycemics.

Encourage Fluids

Encouraging Fluid

To prevent renal damage related to crystalluria, patients should be encouraged to drink eight to ten glasses of water per day. Adults taking sulfonamides should maintain a daily urine output of at least 1,200 milliliters.

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