Snow Globe Pee: 
Sediment in the Urine 
by Susan Agrawal

Does your child’s pee look like this?

If so, you are probably dealing with sediment in the urine, which makes urine look cloudy or flaky, somewhat like a snow globe. This is a problem that is common in children who cath or use a Foley catheter, but it may also occur in children who urinate normally into a diaper or toilet. Sediment in a child wearing diapers typically appears as flakes or globs on the child’s skin that are apparent when changing the diaper.

All children normally experience some sediment in the urine. It is only when the sediment becomes excessive or is an unusual type that it becomes an important medical issue.

In this article, we will look at some of the typical causes of sediment in the urine, tests to help diagnose the problem, and potential treatments to minimize the complications of sediment.

Causes

The sediment you see in urine can be made up of a variety of substances, including sloughing of tissue (debris), crystals, casts, small stones, or cells. Depending on the type of sediment, the cause may vary considerably.

The most common cause of sediment in the urine is a urinary tract infection. In this case, the urine will contain cells, especially white blood cells, or pus. This type of sediment typically looks cloudy instead of flaky. The urine may have an odor.
Small amounts of certain crystals may be normal in urine, but certain types of crystals or large quantities of crystals may be a sign of a problem, especially in children with metabolic or kidney issues. Crystals may be caused by a variety of different substances. Those that can be normal in small quantities include the following:

- Uric acid
- Amorphous Urate
- Ammonium Biurate
- Calcium Carbonate
- Calcium Phosphate
- Calcium Oxalate
- Triple Phosphates
- Amorphous Phosphates
- Hippuric Acid

The following types of crystals are always abnormal:

- Cystine
- Cholesterol
- Bilirubin
- Leucine
- Tyrosine
- Crystals from drugs, including sulfa drugs

Uric acid crystals, some calcium crystals, and some phosphate crystals are often associated with kidney stone formation.

Children who are dehydrated often present with crystals in the urine. Dehydration is one of the most common reasons for normal crystals in the urine to increase considerably.

Children on nutritional support or who take certain medications (especially Topiramate, laxatives, or diuretics) may be more prone to crystals and stones. Excess calcium and/or phosphate in the diet may result in stones, and electrolytes that are wasted from diuretics may result in crystals. Children on parenteral nutrition (IV nutrition) or nutritional supplements may need them tweaked to reduce crystal formation.

Certain types of bacteria can raise the pH of the urine, which then encourages the development of crystals. *Proteus* species are particularly known for having this effect, and often cause stones called struvite stones. Anything else that raises the pH of the urine above 7 (alkaline urine) may also promote crystal and stone formation.

In people with diabetes or metabolic issues, both glucose and ketones may be found in the urine. Similarly, people with liver problems may have bilirubin in the urine. These types of sediment may be more obviously detected by smell or color.
Red, brown, or dark colored urine may be caused by blood or red blood cells in the urine. This type of sediment may appear as small clots or simply discolored urine.

Commonly, flaky debris in the urine comes from casts, which are abnormal cells, parts of cells, or even sloughed off tissue. This typically occurs in children with underlying urinary tract or kidney problems, or children who are catheterized. Types of casts include the following:

- Hyaline
- Red Cell
- White Cell
- Epithelial
- Granular
- Waxy
- Fatty

Testing

Testing for children with persistent sediment should begin with a simple urinalysis and culture. This test will screen for the most common cause of sediment in the urine, which is infection.

A urinalysis contains several tests that can help determine the cause of sediment. Leukocyte and nitrite levels, along with culture results, can help screen for infection. Specific gravity of the urine can help detect dehydration. The urine pH can suggest that certain types of crystal formation may be occurring. Protein, bilirubin, ketones, glucose, and red blood cells are also detected in a standard urinalysis.

Children with sediment should also have a microscopic analysis of their urine performed. Sometimes this is included with a standard urinalysis; other times it must be ordered separately. In this test, the urine is spun to obtain the sediment. The sediment is then placed under a microscope and the types and quantities of cells, casts, and crystals are determined.

In some institutions, a Kidney Stone Risk Panel may also be performed. This test evaluates the composition of the urine, including urine electrolytes and other elements, such as urine creatine, uric acid, and urine oxalate. It can help determine if crystal and stone formation is likely, and if so, what types of crystals and stones may develop. Often, changes in nutritional support or supplements can improve a child’s urine composition.

For children with suspected kidney or metabolic issues, additional testing may be required to determine the underlying cause of the problem.
Treatment

Sediment in and of itself requires no treatment; it is instead a symptom of another problem that may or may not be treatable. For example, a urinary tract infection can be treated, thereby eliminating the cause of the sediment, or the sediment from certain metabolic or kidney problems may be improved through medications.

In some cases, changes in nutritional support or supplements can be made to reduce crystal formation. For example, children on parenteral nutrition may need adjustments in several components to alter the urine pH or reduce the likelihood of stone formation.

Sediment can be a practical problem for those who cath or use a Foley catheter. Sediment can clog the catheter, thereby rendering the catheter useless. In this case, frequent irrigations of the bladder through the catheter using sterile irrigation solution may reduce the amount of sediment. For children with bacterial colonizations due to catheter use, a daily antibiotic instillation of gentamicin or another antibiotic may assist in reducing bacterial growth and resultant sediment.

A “Cosmetic” Clue

Urine sediment is for the most part a cosmetic problem, but it can signal a more serious underlying issue that should be diagnosed and treated. If your child has persistent problems with sediment or a sudden increase in sediment, a physician should evaluate him or her. Many children see kidney doctors (nephrologists), but urologists and pediatricians may also be able to begin the evaluation process.