German Federal Institute for Risk Assessment

FAQ

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Dangerous chemical burns in the throat: questions and answers about button cells

Button cells are small, flat batteries that are found in many devices: from wristwatches to remote controls and children's toys. However, button cells can be dangerous for smaller children: if swallowed, they can get stuck in the oesophagus. Contact with the moist mucous membranes often results in a current flow that can cause severe chemical burns. In the worst case, the injuries can even be fatal. In the past ten years, the German Federal Institute for Risk Assessment (BfR) has been notified by hospitals and poison information centresof several hundred cases of swallowed button cells. Those affected often develop obvious symptoms only after several hours. The BfR therefore advises people who suspect that e.g. their child might have swallowed a button cell to go to a paediatric hospital or emergency department immediately.

What are button cells?

Button cells are small, round, shiny metallic battery cells. They are usually only a few millimetres high, have a diameter of 5 to 25 millimetres, and supply a voltage of 1.35 to 3 volts, depending on the type. The name "button cell" is derived from the design, which looks like a button.

In which products are button cells used?

Button cells are used in many different electronic products: typical examples include wristwatches, calculators, remote controls, electronic car keys, mini torches, hearing aids and kitchen scales. Button cells are also frequently used in children's toys.

What are the health risks of swallowing button cells?

Complications are rare if the button cell passes unimpeded down the oesophagus into the stomach. It is then usually excreted naturally.

However, there is a risk of dangerous chemical burns if the button cell gets stuck in the oesophagus. They are caused by the button cell coming into contact with the moist mucous membranes. This causes current to flow, which then produces hydroxide ions at the point of contact. These ions can lead to serious burns.

There are often no symptoms at all or only a slight feeling of discomfort directly after swallowing. After a few hours, vomiting, loss of appetite, fever or coughing increasingly occur. If tissue damage progresses further, this leads to bleeding in the oesophagus and the tissue begins to die.

The more the battery is charged and the longer the button cell remains in the oesophagus, the more distinct the health damage can be. A long-term effect may include the oesophagus becoming scarred and narrowed. In rare cases, complications can also lead to death.

Is there also a risk of poisoning from the button cells' components?

If a button cell is swallowed and ends up in the stomach, the outer shell of the button cell may become damaged by reacting with the stomach acid and components may leak from the inside. Serious poisoning is not expected. The use of the toxic metals mercury, cadmium and lead in button cells is now heavily restricted by law in the European Union (EU). Part of the hospital examination includes the decision as to whether the button cell should be recovered or whether to wait for natural excretion.

What should parents do if their child has swallowed a button cell?

If a child has swallowed a button cell, they should be taken immediately to a paediatric hospital or an emergency department for examination. The longer a battery remains in the oesophagus, the more severe the health consequences can be.

How can parents tell if their child has a battery stuck in their throat?

A button cell stuck in the oesophagus is barely noticeable to parents. Furthermore, those affected often develop no or only minor symptoms in the first few hours. The BfR therefore advises people who suspect that their child might have swallowed a button cell to go to a paediatric hospital or emergency department immediately.

How are poisoning accidents with button cells treated?

If the examination reveals that the button cell has already passed the oesophagus and entered the gastrointestinal tract, it is usually sufficient to wait for the button cell to be naturally excreted. Conversely, button cells in the oesophagus or other orifices (e.g. nose, ears) must be removed as quickly as possible. An endoscope, usually a tube-like medical instrument, is used for this purpose. The button cell can be seen using the endoscope's camera and recovered with a gripping tool. Depending on the extent of the tissue damage that has occurred, further medical intervention is then necessary. In severe cases, intensive medical treatment and feeding by stomach tube may be necessary over a longer period of time until the wound in the oesophagus is closed.

How can accidents with button cells be avoided?

Toys with button cells sold in the EU must always be secured so that no direct access to the button cell is possible, for example, in a battery compartment secured with screws. Parents should make absolutely sure that all button cells are inaccessible to children also with other devices and when storing new and used button cells – even batteries that are presumed empty.

Some battery manufacturers now use packaging in which each button cell is individually packed and that can only be opened with scissors. Some button cells are also coated with bitter substances so that children will reflexively spit them out.

Are button cells also a problem in other orifices?

Children may stick objects into orifices, such as the nose and ears, while playing. Button cells can also cause massive tissue damage in the nose and ears. If it is suspected that the child has inserted a button cell into an orifice, they should be taken to hospital immediately.

What materials are button cells made of?

The button cells' shiny casing is usually made of stainless steel. The material inside the battery depends on the type and can be identified by the first two letters of the type designation. This "IEC designation" is usually engraved or embossed into the casing and is also found on the packaging.

The first letter indicates the chemical composition of the battery cell. For example, "C" stands for lithium-manganese dioxide cells, "L" for alkaline-manganese batteries and "S" for silver oxide-zinc batteries. The second letter of the type designation describes the design: "R" stands for round. The numbers after the letters indicate the size of the button cell. If it says 2032, for example, this means that the button cell has a diameter of 20 millimetres and a height of 3.2 millimetres.

If available, this information can help with treatment by the doctor or advice from the poison information centre, as the size of the button cell affects the probability of the battery becoming stuck.

Which button cells are particularly problematic?

Lithium button cells are particularly problematic because they have a comparatively high electrical voltage. Large button cells (over 20 millimetres) also pose a greater risk as they are more likely to get stuck in the oesophagus.

About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the German Federal Ministry of Food and Agriculture (BMEL). The BfR advises the Federal Government and the German federal states ("Laender") on questions of food, chemicals, and product safety. The BfR conducts independent research on topics that are closely linked to its assessment tasks.

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