Case Review

UNINTENTIONAL LEVOTHYROXINE TOXICITY IN CHILDREN - A CASE REVIEW ON CHILD-SAFE MEDICATION CONTAINERS.

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ABSTRACT

Since Every minute of every day, a poison control centre answers a call about a young child getting into unintentional pill ingestion nearly about 500,000 calls per year. We are reporting a rare and unique double case of drug toxicity in identical twin toddlers, resulting from the common and frequent mistake of grandparents of leaving their pill bottles on places accessible for toddlers, contributed by lack of "Child Proof" Pill Container in Indian Medication bottles.

Keywords: child proof; levothyroxine; pill ingestion; pill container; toxicity in children.

INTRODUCTION

Safety is a priority for anyone who regularly takes care of young children. Whether it's installing stair gates to prevent falls or using electrical socket covers to avoid shocks, every caregiver goes through the process of making their house safer for an adventurous child. One risk that might not be top-of-mind, however, is medicine safety. Every minute of every day, a poison control center answers a call about a young child getting into medicine or getting too much medicine.[1] In 2012, there were almost 64,000 emergency department visits that involved a child exposed to medicine. Every one of these emergency department visits involved a scared child and a worried family, and could have been prevented. On top of that, an estimated $34.4 million is spent every year on medical costs for trips to the emergency department as a result of medicine exposures in young children, twice what the government spends annually on poison control centers. In 3 out of 4 of these cases, the medicine belonged to a parent or grandparent.[1]

CASE REPORT

Three-year-old females, identical twin siblings, presented to the emergency department of Medanta-the Medicity, after found playing with an empty glass bottle of levothyroxine tablets of dose 100mcg each belonging to their grandmother and mother, both suffering from hypothyroidism, originally containing 59 tablets. When grandparents of siblings searched below their bed at home, they could recollect 49 tablets of levothyroxine, but still 10 tablets could not be found, and suspected that both kids have ingested 4-5 tablets of 100mcg levothyroxine individually. Grandparents suspected that the children must have ingested the 10 missing levothyroxine tablets, so brought the twins in our ED in asymptomatic state after 2 hours of ingestion. On clinical examination, vital parameters of both twins were stable. Due to identical face and appearance, similar clothes and inability of the patients to speak their name clearly, it was difficult situation for doctors and nurses to identify the patient identity during monitoring and sampling. By utilizing JCI (Joint Commission International) guidelines, checking unique identification by name and UHID number before doing any procedure, was very helpful in safe and error free monitoring of both identical toddler patients.[7] Poison control centre and Pediatric Endocrinologist was consulted, who advised close observation and thyroid

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profile for both the patients. Gastric lavage was not done due to delayed presentation of cases, i.e. after two hours of ingestion, suggestive of crossed gastric emptying time of one hour.[2] Thyroid profile of both the patients came within normal limits on the day of ingestion, and both patients were discharged in stable asymptomatic condition on request of parents, and to follow up with repeat thyroid profile on next day. On next day, both toddlers were brought by the parents, readmitted in Hospital with fever, sweating, uneasiness, restlessness and insomnia. Thyroid profile Samples were repeated and lab reported critical values of thyroid profile of both siblings (free T3= 7.99 pg/mL; Free T4= 3.88 ng/mL; TSH= 1.690uIU/mL in first patient) and (free T3= 6.96 pg/mL; Free T4= 3.73 ng/mL; TSH= 1.390uIU/mL in second patient), suggestive of Thyroxine toxicity in both cases.[2] Patients were continuously monitored via cardiac monitor and symptomatically managed with Propanolol to block the peripheral effects of levothyroxine. Both kids had responded to the treatment and became asymptomatic after 48 hours. They have discharged in stable condition once the thyroid profile returned to normal level.

DISCUSSION

Acute ingestion of levothyroxine results in only mild symptoms, usually days after ingestion.[3] If the grandparents had used "Child Proof" Pill Container[4] for storing Levothyroxine tablets, it would have prevented Unintentional Medicine Exposures in both kids.[4] In 3 out of 4 of these cases, the medicine belonged to a parent or grandparent. It is advisable to monitor these kids with unintentional toxicity through follow up telephone calls for 5 days at home, if initially asymptomatic or minimal symptoms, due to prolonged onset of action of levothyroxine. Levels of T3, T4 and protein bound iodine may be markedly elevated both with and without clinical signs of toxicity. These lab values of serum Thyroxine levels are virtually no help in treatment or prognosis of the acute overdose. Gastric decontamination is not necessary in levothyroxine overdose. Propanolol and Prednisolone can be used to block the peripheral effects of circulating levothyroxine. Fatalities are extremely unlikely with acute thyroid hormone overdose.[3] On top of that, an estimated $34.4 million is spent every year on medical costs for trips to the emergency department as a result of medicine exposures in young children, twice what the government spends annually on poison control centers.[5] JCI (Joint Commission International) guidelines for patients safety, by asking name of the patient and checking patient's wrist band unique identification having complete name and UHID (Unique Hospital Identification) number; before doing any procedure; is very helpful in safe and effective error free monitoring of identical patients, patients with similar names, and during language barrier.[7] Recent Trends in Unintentional Medicine Exposures: Every day young children are seen in emergency departments after getting into medicine or being given too much medicine. In 2012, there were 63,952 visits to emergency department for children[8] and under involving exposure to a medicine, either unsupervised or as a result of a dosing error.[4] The average medical cost of a poisoning-related emergency department visit for a child this age is $539, which means that these visits cost an estimated $34.4 million each year.[5] And we've seen in USA, new initiatives focused on medicine safety for children and safe storage, including the CDC PROTECT Initiative[9]; the Up and Away Campaign;[10] and educational campaigns such as Safe Kids Worldwide's medication safety program.[11] But these campaigns are missing in Indian subcontinent. It's clear that with almost 64,000 visits to emergency departments because of medicine exposures in children in 2012, we still have work to do. Survey Findings in Safe Kids: Grandparents, Playing a Bigger Role than Ever. Grandparents have safety in mind, but aren't always thinking about their medicine as a potential danger for young kids. We found that medicine safety isn't a top-of-mind issue for most grandparents when it comes to their grandkids—after supervising grandchildren, top safety issues that grandparents name include electrical outlets (12 percent), falls (11 percent) and stair safety (10 percent) when asked in an open-ended question on important home safety issues.[12] When it comes to storing children's medicine between doses, many grandparents are diligent about storing medicine up and away: 48 percent store their grandchild's medicine in a cabinet above the counter or sink in between doses. However, we learned that 13 percent keep the child's medicine on the bathroom or kitchen sink, counter or table - where children can easily see and reach it. It's especially important to put medicine that is being used in a safe place. In a study of children who got into over-the-counter medicine, researchers found that 60 percent of caregivers said that the medicine wasn't in its normal storage location when the child got into it.[12] A study using data from 2000 to 2009 found that an increase in the number of prescriptions for four categories of adult medicine – oral hypoglycemics, antihyperlipidemics,

beta-blockers, and opioids – was associated with a rise in exposures in young children reported to poison control centers.[7] These findings reiterate the importance of keeping medicines safely stored when young children are in the home. Poison control center should be created in every district of India having Public and Private Hospital with functional Emergency Department, and the local 24 hours poison control center helpline number should be publicized in Newspapers, FM Radio and TV channels as part of public awareness campaign for kid's safety against Unintentional Medicine Exposures.

CONCLUSION

Keep all medicine up and away when toddlers are around – even medications we take every day. Poison control center should be created in every district of India having Public and Private Hospital with functional Emergency Department, and the local 24 hr poison control center helpline number should be publicized in Newspapers, FM Radio and TV channels as part of public awareness campaign for kid's safety against Unintentional Medicine Exposures. And Last but not the least, is the public health initiative to be taken by Indian pharmaceutical companies for "Child Proof" Pill Container in all the Medication bottles to prevent Unintentional Medicine Exposures in kids.[6]

Conflicts of interest: declared none.

REFERENCES

1. Mowry JB et al. 2012 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 30th Annual Report. Clinical Toxicology. 2013;51: 949-1229.
2. Singh, Meherban. Medical Emergencies in Children. 5th Edition. Sagar Publications. New Delhi. 2012. Prevention of Poisoning. P817-18.
3. Pillay, VV. Comprehensive Medical Toxicology. 3rd Ed. Paras Publishers. Hyderabad. 2018. Thyroxine toxicity. P808-09.
4. U.S. Consumer Product Safety Commission. NEISS Estimates Query Builder. Available at https://www.cpsc.gov/cgibin/NEISSQuery/home.aspx. Accessed Dec 27, 2017.
5. CDC WISQARS Cost of Injury Reports. Base year 2005, medical costs, 0-4 years. Available at http://www.cdc.gov/injury/wisqars/cost/costlearn-more.html. Accessed Dec 27, 2017.
6. Ferguson RW, Mickalide AD. An In-Depth Look at Keeping Young Children Safe Around Medicine. Washington, DC: Safe Kids Worldwide, March 2013. Available at http://www.safekids.org/medsreport. Accessed Dec 27, 2017
8. Byrne, Katie. JCI Accreditation Standards for Hospitals, 6th Edition. Publisher**:** Joint Commission Resources; 2017.
9. Ferguson RW, Mickalide AD. An In-Depth Look at Keeping Young Children Safe Around Medicine. Washington, DC: Safe Kids Worldwide, March 2013. Available at http://www.safekids.org/medsreport. Accessed Dec 27, 2017
10. Centers for Disease Control and Prevention. The PROTECT Initiative: Advancing Children's Medication Safety. Available at http://www.cdc.gov/medicationsafety/protect/protect_initiative.html. Accessed Dec 27, 2017
11. Up and Away and Out of Sight. Available at http://www.upandaway.org/. Accessed Dec 27, 2017
12. Safe Kids Worldwide. Medication Safety. Available at http://www.safekids.org/medicinesafety. Accessed Dec 27, 2017
13. Schoenewald S et al. New insights into root causes of pediatric accidental unsupervised ingestions of over-the-counter medications. Clinical Toxicology. 2013;51: 930-6.
14. Burghardt LC et al. Adult prescription drug use and pediatric medication exposures and poisonings. Pediatrics. 2013; 132: 18-27.