Editorial

Nontoxic ingestion

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Very few children die from poisoning. However, many are admitted to hospital for treatment and observation. Even more present to general practitioners or hospital accident and emergency departments with 19% of children having at least one incident of poisoning or suspected poisoning[1]. Accidental poisoning is mainly seen in children under 5 years with a peak at 2 1/2 years of age[1]. The majority of such poisoning episodes are asymptomatic or produce minimal symptoms and are not harmful to the child[2]. In other words they are nontoxic. Let us consider some of these nontoxic ingestions.

Writing inks of the blue or black variety contain ferrous sulphate, tannic acid and gallic acid and are non toxic[3]. Red ink may be toxic in doses of 1 ml per kg and green and purple inks contain aniline dyes which are hazardous if taken in large amounts. Ballpoint pen ink contains carbitol 10% or diethyl glycol, both of which have an estimated lethal dose of 30g[3]. The amount available in the ink cartridge does not represent a hazard. Pencils of the lead variety contain nontoxic graphite. Coloured pencils may contain toxic pigments but the small amounts ingested are not hazardous[3]. Crayons are mixtures of stearic acid and paraffin coloured with harmless pigments[4]. Chalk contains calcium carbonate and kaolin or occurs naturally as limestone and is not toxic. Coloured chalk is also nontoxic[3].

Cosmetic preparations for skin use are relatively safe unless large amounts in excess of 5g per kg are ingested[3]. Baby product cosmetics are very innocuous, the toxic ingested dose being in the neighbourhood of 15g per kg[3]. Talcum powder ingestion is innocuous but aspiration can produce symptoms resembling those of bronchiolitis[5]. Nail polish and nail polish removers contain a variety of solvents, including acetone. Acetone can cause coma and irritate mucous membranes but few children who swallow it come to any harm and serious toxicity is rare[3].

Soaps are salts of fatty acids and alkali. They may cause vomiting. Medicinal soaps contain such a small amount of antibacterial agents that they do not present an additional hazard[6]. Bubble bath soaps are detergents and dilution with bath water mitigates their minimal toxicity[6]. Detergents for laundry and general use and those made especially for washing machines are of low toxicity. They contain anionic surfactants, fatty acid amides, sodium tripolyphosphates, tetrasodium pyrophosphate, sodium O-phosphate, sodium metaphosphate, sodium silicate, sodium sulphate and sodium carbonate, all of low-order system toxicity[6,7]. They may cause mild mucous membrane irritation, resulting in gastroenteritis. Liquid household detergents are also of low toxicity[6,7]. The addition of bleaching agents and enzymes to the detergents does not increase their toxicity.

Bleach is sodium or calcium hypochlorite, 3 to 6% for household use and 10% for washing machines. Accidental ingestion of household bleach causes fewer problems than would be expected. Craft et al found no cases that had any serious symptoms in their series[8]. Ink eradicators contain sodium hypochlorite and do not cause harm.

Liquid shampoos are composed of detergent and soap and are nontoxic but dry shampoos may contain carbon tetrachloride and isopropyl and methyl alcohol which are very toxic[3]. Deodorants contain aluminium salts and antibacterial agents and are not hazardous[3]. Suntan preparations contain ethyl alcohol, brucine sulphate and organic solvents. Large amounts can lead to alcohol intoxication[3]. Tooth paste is nontoxic, but large amounts of stannous fluoride can cause vomiting[3]. Silica gel is hygroscopic and is commonly found in cases containing electronic equipment. It may be ingested by children but is non–toxic[3].

Cigarettes and cigars contain nicotine, which is potentially very harmful but which is not readily absorbed from ingested tobacco and protective vomiting frequently occurs. One cigarette contains 10-18 mg of nicotine with the toxic dose being 1 mg per kg[3]. Werner reported on 355 Swedish children who ingested tobacco with only very mild symptoms[9]. There is almost no nicotine in cigarette ash[3].

Matches contain potassium chlorate. The heads of 20 safety matches contains 220 mg. A 1 year old could consume several boxes of matches before toxicity[3]. Candles contain paraffin and beeswax and are non toxic. Paraffin toxicity is in excess of 2 g/kg[3].

Merthiolate and mercurochrome are organic mercury compounds which are not well absorbed and rarely produce intoxication[3]. Hexachlorophene acts like phenol and is relatively innocuous unless large amounts are ingested. The fatal dose is 2g but the usual preparations have only a 1-3% concentration[3]. Antibiotics, with certain exceptions such as ciprofloxacin, sulphasalazine and chloramphenicol, are of low toxicity if taken accidentally by children[10]. Similarly, antacids, calamine and zinc oxide do not cause serious symptoms if ingested by children[10]. Oral contraceptives have a theoretical risk of breast enlargement and withdrawal bleeding if taken accidentally by children but this must be very rare and does not need treatment[10]. Antihistamines and most cough medicines do not cause serious symptoms in the quantities taken by children. Drowsiness may occur but this does not usually need treatment[10].

Candy laxatives which contain mainly phenolphthalein are relatively nontoxic. The catharsis they produce usually subsides in 3 days[3]. Vitamins are nontoxic in amounts usually available[3]. There is only 1 mg of fluoride per tablet or 10 drops which represents no additional hazard, since the fatal dose of fluoride is 50-225 mg per kg[3]. Single tablets of medication, even of adult dosage will not produce significant toxicity if ingested by a child[3].

Ethyl alcohol is fatal in doses of 6 ml/kg of 100% alcohol if ingested in one hour's time[11]. Since alcohol is rarely of high concentration in any medicinal product it is not considered a significant hazard[3]. Similarly, ingestion of alcohol-containing perfumes, cologne and after shave is non-toxic[12]. Sweetening agents such as saccharin or cyclamate may produce loose stools in amounts over 5-7g but no acute systemic toxicity[3]. The common ingredient of rat poison (warfarin) is usually non-toxic in the doses taken by children. If large amounts of warfarin are ingested vitamin K can be used but this is not needed in most cases. Craft et al found no serious cases in their series[8].

Thermometers contain metallic mercury, which oxidizes too slowly to yield mercury ions for absorption from the intestinal tract and is not a hazard. A small danger exists from the broken glass[13]. Mosquito coils contain pyrethrum and related compounds. Poor absorption via the gastrointestinal tract and rapid detoxification in the liver are the main reasons for low toxicity to man[14]. Teething rings and bathtub floating toys contain water, glycerin or mineral oil. The toxic dose of glycerin and mineral oil is in excess of 2 g/kg which makes the toxicity negligible[3].

Paints contain a large variety of potentially toxic metallic compounds but these are too slowly absorbed to be of consequence. The ill effects of ingestion are caused by the petroleum distillate vehicle[3]. Dried indoor paint contains less than 1% lead and is safe[3]. Outdoor paints have large amounts of lead and repeated ingestions can cause lead intoxication. A paint chip of outdoor paint the size of a finger-nail has 100 mg of lead, which is 200 times the safe single daily dose[3]. The emulsion type latex base paints are not seriously toxic in doses of less than 5 ml per kg[3].

What then is the importance of the nontoxic ingestion? It serves as a warning of inadequate supervision or of an improper and unsafe environment which should be corrected before a tragic toxic ingestion occurs[3]. It also serves as a human test of the toxicity of a product. The importance of knowing that a product is nontoxic is that over-treatment is avoided and, more important, the victim and parents are not placed in the jeopardy of a panicky automobile ride to the physician or nearest hospital[3].

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