PACR
Pediatric Academic Case Reports

3(1): 012-016; Feb 2024
Pediatric Academic Case Reports
DOI: 10.61107/pacr.2024.115

Case Report

An Infant Developed Intoxication Following Topical Salicylate Use: A Case Report

Bir Bebekte Topikal Salisilat Kullanımı Sonrası Zehirlenme Gelişimi: Olgu Sunumu

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ABSTRACT

Salicylate, also known as aspirin, is utilized in treating many conditions due to its anti-inflammatory, antipyretic and antiaggregant effects. Alongside this, it is infrequently applied topically in dermatological practices due to its fungicidal, keratolytic and bacteriostatic properties. It is important to note that a toxic intake of salicylate can be fatal and may result in a range of metabolic disorders. Salicylate toxicity should be considered in paediatric emergency department patients presenting with tachypnoea and metabolic acidosis on blood gas. A thorough history and physical examination should be selected as the initial evaluation step in approaching the patient. In this case report, we present a 50-day-old patient who was effectively treated with haemodialysis following topical salicylate use for cutaneous scabies.

Keywords: *intoxication, salicylate, topical, infant*

ÖZET

Salisilat (aspirin) birçok hastalığın tedavisinde antienflamatuvar, antipiretik ve antiagregan etkileri ön planda olmak üzere kullanılmaktadır. Ayrıca nadiren de olsa dermatolojik olarak fungosidal, keratolitik ve bakteriostatik etkileri sebebiyle topikal olarak tercih edilmektedir. Toksik alımı hayatı tehdit edici olabilen salisilat, toksisite durumunda birçok metabolik bozuklukla prezente olabilir. Çocuk acil servise takipne ile gelen kan gazında metabolik asidozu olan hastalarda salisilat intoksikasyonu da akla gelmelidir. Bunun için de ayrıntılı bir öykü ve tam bir fizik muayene hastaya yaklaşımda öncelikli değerlendirme basamağı olarak seçilmelidir. Bu olgu raporunda ciltte scabiyazis nedeniyle topikal salisilat kullanımına bağlı gelişen toksisite sonrası hemodiyaliz ile başarılı bir şekilde tedavi olan 50 günlük bir hasta sunuldu.

Keywords: *zehirlenme, salisilat, topikal, infant*

INTRODUCTION

Salicylic acid is a widely used analgesic, antipyretic, and anti-inflammatory medication globally. Nevertheless, its usage in children has been progressively restricted in recent years due to its association with Reye's syndrome. Its topical application is frequently due to its keratolytic, bacteriostatic, fungicidal, and photoprotective effects. Through this use, it has been observed to decrease keratinocyte proliferation (1, 2, 3).In paediatric dermatology, salicylates are employed in treating psoriasis, warts, ichthyosis, and various hyperkeratotic

Received: 10.11.2023 · **Accepted:** 14.01.2024 · **Published:** 28.02.2024

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Cite this article as: Fil E, Dilek S, Umur O, Dag H. An Infant Developed Intoxication Following Topical Salicylate Use: A Case Report. Pediatr Acad Case Rep. 2024;3(1):12-6.

diseases (4). However, excessive or prolonged topical use of salicylates may result in toxicity despite their infrequent occurrence (5).

Salicylate toxicity can manifest clinically through hypoglycaemia in children, metabolic acidosis with hyperglycaemia in adults, and respiratory alkalosis due to hyperventilation, which results from medullary respiratory centre impairment (2). Clinical presentation of salicylate toxicity varies depending on serum salicylate levels. If the serum concentration is <30 mg/dL, it typically proceeds without symptoms. Salicylate concentration between 15-30 mg/dL is typically therapeutic for inflammatory diseases. Between serum concentrations of 30 mg/dl and 50 mg/dl, patients may exhibit signs of intoxication. These signs include tachypnea, nausea, vomiting, tinnitus, and dizziness. When the serum salicylate level is between 50 mg/dl and 70 mg/dl, the signs of intoxication become more pronounced and may present with tachypnea, fever, sweating, weakness, and dehydration. If the serum salicylate concentration exceeds 75 mg/dl in these patients, they may experience stupor, coma, seizures, cerebral oedema, dysrhythmia, heart failure, hypotension, coagulopathy, oliguria, and renal failure. It may not be possible to measure the serum salicylate level in every patient. In such cases, clinicians must rely on clinical findings to evaluate the patient. If the interval between toxication and laboratory tests is long, the serum salicylate level that causes the related toxication may be higher than the level of the resulting test (6, 7). Dermal absorption is significantly increased in paediatric patients owing to the high ratio of body surface area to weight, resulting in higher skin perfusion than adult patients. This, in turn, increases the toxicity potential from topical exposures (8). Dermal absorption is significantly increased in paediatric patients owing to the high ratio of body surface area to weight, resulting in higher skin perfusion than adult patients. This, in turn, increases the toxicity potential from topical exposures (8). Patients with acute salicylate intoxication require monitoring. Regulate fluid resuscitation for metabolic acidosis with bicarbonate treatment and perform symptomatic treatment for clinical findings in other systems. Use haemodialysis to lower serum salicylate levels and consider follow-up in the paediatric intensive care unit if necessary (9).

After obtaining consent from the family of the infant, a case study is presented here to contribute to the literature. It pertains to a pediatric patient who was treated in the pediatric intensive care unit after hemodialysis and subsequently developed salicylate intoxication due to topical medication intake.

CASE REPORT

A 50-day-old male patient presented with complaints of reduced sucking for one week and coughing for three days. Physical examination revealed secretory rales, intercostal and subcostal retractions, tachypnea. The cardiovascular examination was normal, with no evidence of cardiac abnormalities. Skin examination revealed widespread lesions compatible with scabies, and it was noted that family members had similar lesions (see Figure 1, 2 and 3). The patient was noted to be dehydrated and droopy, and no additional pathological findings were noted in other systemic examinations. Body temperature was 38°C, peak heart rate was 160/min, respiratory rate was 60/min, oxygen saturation was 99% on room air and capillary filling time was <3 s. Intravenous cefotaxime 150 mg/kg and intravenous ampicillin 200 mg/kg were started with a pre-diagnosis of sepsis and bronchopneumonia accompanied by fever and tachypnea. Venous blood gases obtained on admission showed pH 7.29, PCO2 25 mm Hg, HCO3 12.1 mmol/L, base deficit (BE) -14 mmol/L and lactate 1.86 mmol/L. Our patient's blood gas values are summarised in Table 1. The patient, who was diagnosed with metabolic acidosis and respiratory alkalosis, received sodium bicarbonate following iv salum physiological loading. Despite receiving oxygen through a reservoir mask at a rate of 10 litres per minute, the patient's respiratory symptoms worsened. As a result, the patient was connected to a high-flow nasal cannula oxygenation device (HFNC). No abnormalities were found in the haemogram and biochemistry tests. However, coagulation tests (Table 2 and Table 3) revealed the PT of 32.9, aPTT of 45.7, d-dimer levels of 910 ng/ml, and INR of 2.66. As a result, 3 mg of intravenous vitamin K was administered. The transthoracic echocardiography results were normal. The patient's metabolic disease history underwent further analysis, revealing his parents were first cousins with no known disease history. Additionally, there was no history of sibling death, and his sibling was healthy. The family previously reported no past medication use, but upon further questioning regarding medication for skin lesions, they disclosed the use of an unknown cream. The family brought a drug to the hospital, which was identified as a cream made with majistral salicylate. The control venous blood gas test revealed pH 7.25, PCO2 22 mm hg, HCO3 9.8 mmol/L, and BE -16 mmol/L at the end of the bicarbonate-elevating fluid. The physical examination indicated increased respiratory findings and retractions. The patient was admitted to the paediatric intensive care unit with a suspected case of metabolic acidosis ac–

companied by persistent increased anion gap and sepsis. The patient's blood salicylate level was measured at 46.9 mg/dl, exceeding the normal range of 3-25. The patient received haemodialysis and continued with antibiotherapy. After undergoing haemodialysis, venous blood gas was monitored and recorded as pH 7.34, PCO2 35.6 mmHg, HCO3 18.6 mmol/L, BE -6 mmol/L (refer to Table 3). Both c-reactive protein and procalcitonin, which are acute phase values, were normal both at the time of initial presentation to the emergency department and at the time of discharge. Subsequently, the control coagulation test result was observed to have returned to the normal range as per the age criteria. Following haemodialysis and antibiotics treatment, the patient's clinical findings improved and their physical examination was normal. Antibiotic treatment was stopped on the 7th day as no growth was detected in the blood culture. The patient was discharged thereafter.

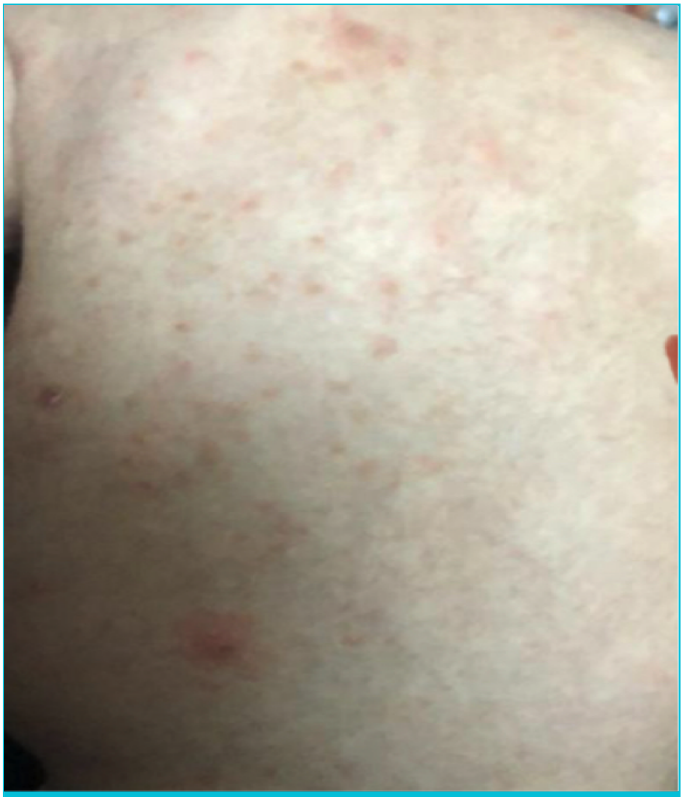

Figure 1. Scabies lesions on the back of a 50-day-old infant

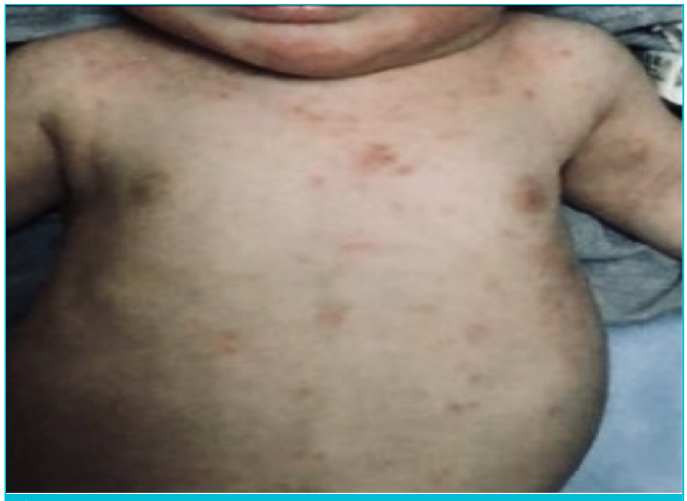

Figure 2. Scabies in the chest and abdominal skin region in a 50-day-old infant

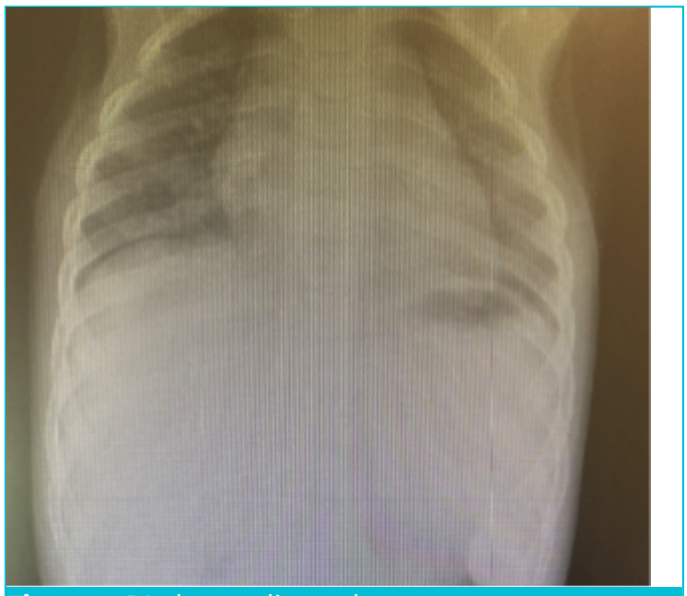

Figure 3. PA chest radiograph

Table 1. Blood Gas Values of the Patient

Blood gas	pH	PCO2 (mm/hg)	HCO3 (mmol/l)	BE (mmol/l)	Lactate (mmol/l)
Initial Blood Gas Values in the Emergency Department.	7,29	25	12,1	-14	1,86
Blood gas values after dextrose fluid containing sodium bicarbonate	7,25	22	9,8	-16	1,8
After haemodialysis, Blood gas values	7,34	35,6	18,6	-6	1,1

PH: Potential of Hydrogen; Partial pressure of carbon dioxide; HCO3 (mmol/l): Bicarbonate; BE: Base excess

Table 2. Complete Blood Count Values of the Patient

Complete Blood Count	White Blood Count (10^3/Ul)	Hemoglobulin (g/L)	Haematocrit (%)	platelet (10^3/Ul)	Absolute neutrophil count (10^3/Ul)
Initial CBC Values in the Emergency Department.	12000	10,2	30,1	376000	5800
After haemodialysis, CBC values	10200	9,6	29,9	349000	4700

CBC: Complete Blood Count

Table 3. Serum Biochemical and Coagulation Values

	Urea (mg/dl)	Creatinine (mg/dl)	AST(u/l)	ALT(u/l)	Albumin	Na (Mmol/L)	K (Mmol/L)	Pt (seconds)	Aptt (seconds)	Inr
Initial biochemicalValues in the Emergency Department.	8	0,2	25	17	3,5	143	3,8	32,9	45,7	2,6
After haemodialysis, Biochemical values	14	0,21	32	30	2,9	147	3,7	11	29	1,2

AST: Aspartate Transaminase; ALT: Alanine Aminotransferase; Na: sodium; K: potassium; Crp: C-reactive protein; pt: Prothrombin Time; aptt: activated partial thromboplastin time; Inr: international normalised ratio

DISCUSSION

Salicylate toxicity is a potentially life-threatening condition that may have varying outcomes based on the level of serum salicylate and the duration of exposure. Analysis of data collected from patients hospitalized in the United States between 2003 and 2014 due to salicylate intoxication revealed that electrolyte and acid-base imbalances were the most common complications (25% hypokalemia, 19.4% acidosis, and 11.1% alkalosis). In paediatric patients, an acid-base imbalance often favours metabolic acidosis, as has been observed. This condition was also found in our patient. In severe poisoning cases, there have been reports of concomitant organ dysfunction. Renal failure is the most frequently occurring organ dysfunction at 9.3%. Hospitalised patients have a mortality rate of 1% (10). Sodium bicarbonate-induced serum alkalisation is the preferred initial treatment for salicylate toxicity, while symptomatic treatment is prescribed for other clinical conditions. Based on data from the American Poison Control Centre in 2004, cases resulting in death exhibited serum salicylate levels mostly at or above 100 mg/ml, with some cases falling between 50-70 mg/ml. Salicylate concentrations exceeding 100 mg/ml mandate immediate haemodialysis, even if no clinical symptoms are present. Haemodialysis has been reported as a potential treatment option for cases of central nervous system dysfunction, renal failure, pulmonary oedema and metabolic acidosis, which cannot be attributed to any other cause and do not respond to conventional treatments, regardless of serum concentration (11). In this particular instance, while the serum salicylate level did not demand immediate haemodialysis, it was discove–

red that despite bicarbonate treatment the metabolic acidosis worsened and clinical indications deteriorated, leading to the necessity of haemodialysis. Subsequent to treatment, laboratory results returned to a normal range and the clinical outcome improved. It should be noted that salicylate poisoning may have a more severe outcome in paediatric patients. Despite its weak acidity, it has been observed that this substance is capable of crossing cellular barriers, including the blood-brain barrier, rapidly in metabolic acidosis. As a result, it is responsible for causing tissue toxicity (12). Topical toxicity is a widespread occurrence, particularly among children, due to their higher skin-to-body weight ratio. Topical toxicity is more frequently observed in children due to the higher ratio of skin to total body weight. As a result, using salicylate in paediatric patients has been reported to be risky. In our case, the whole body was affected due to scabies and it was observed that salicylate-containing majistral cream was applied to the whole body. It is imperative to exercise caution in all patients, with the patient and their family informed that salicylate or any other drug incorporated into the cream may be hazardous, especially in younger patients, and requires close monitoring.

Patient Consent Form / Hasta Onam Formu

The parents' of this patient consent was obtained for this study.

Conflict of Interest / Çıkar Çatışması

The authors declared no conflicts of interest with respect to authorship and/or publication of the article.

Financial Disclosure / Finansal Destek

The authors received no financial support for the research and/or publication of this article.

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