

fallen to 0.23 mmol/1.73 m² surface area/24 hours and renal ultrasound showed a decrease in the left sided nephrocalcinosis. Urinary calcium to creatinine ratio was 0.10 mmol/mmol.

Discussion

Renal abnormalities have only rarely been recognised in Shwachman's syndrome. Aggett *et al*, in their review of 21 children with Shwachman's syndrome, described 10 children with intermittent and variable glycosuria.² Two children had mild, generalised aminoaciduria and one of these also had tubular acidosis. Marra *et al*, also described a patient with type I renal tubular acidosis.³ Nephrocalcinosis appears to have been reported only once previously and this was at necropsy; no data are available regarding this child's renal function during life.²

Hyperoxaluria and renal oxalate stone formation are common in adults with intestinal disease, particularly that of the ileum.⁴ Fat malabsorption is felt to be the basis of the hyperoxaluria seen in intestinal disease. Long chain fatty acids passing into the colon form soaps with calcium, depriving oxalate of its usual cation and thus increasing its absorption.⁵ Ogilvie *et al* measured urinary oxalate in 62 children with fat malabsorption. Five of the children had pancreatic dysfunction (two with cystic fibrosis, two with Shwachman's syndrome, and one with congenital isolated lipase deficiency). Both of the children with Shwachman's syndrome had hyperoxaluria; one of these was studied again after treatment with pancreatic enzymes and a low fat diet with added medium chain triglycerides, and his oxalate excretion was found to have returned to normal. In none of the children in that study were renal stones shown.⁶

Our patient showed nephrocalcinosis and produced a stone consisting largely of calcium oxalate. His urinary calcium concentration was normal and

he had no evidence of a renal tubular dysfunction or acidosis. Although hyperoxaluria could not be shown, excessive excretion of oxalate would appear the most likely cause of his calculi, and the fall in urinary oxalate on pancreatic enzyme supplementation with concomitant reduction in the degree of nephrocalcinosis supports this hypothesis. This case provides a link between the hyperoxaluria previously described in Shwachman's syndrome⁶ and the report of nephrocalcinosis discovered on necropsy.² The possibility of Shwachman's syndrome should be considered in a child with nephrocalcinosis and failure to thrive, and children known to have Shwachman's syndrome should have periodic urinary oxalate estimations and possibly also renal ultrasound examinations.

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References

- Shwachman H, Diamond CK, Oski FA, Khaw KT. The syndrome of pancreatic insufficiency and bone marrow dysfunction. *J Pediatr* 1964;65:645-63.
- Aggett PJ, Cavanagh NPC, Matthew DJ, Pincott JR, Sutcliffe J, Harries JT. Shwachman's syndrome: a review of 21 cases. *Arch Dis Child* 1980;55:331-47.
- Marra G, Appiani AC, Romeo L, *et al*. Renal tubular acidosis in a case of Shwachman's syndrome. *Acta Paediatr Scand* 1986;75:682-4.
- Smith LH, Fromm H, Hofmann AF. Acquired hyperoxaluria, nephrolithiasis, and intestinal disease. *N Engl J Med* 1972;286:1371-5.
- Silverman A, Roy CC. Malabsorption syndrome. *Pediatric clinical gastroenterology*. 3rd ed. St Louis: CV Mosby, 1983: 249-303.
- Ogilvie D, McCollum JPK, Packer S, *et al*. Urinary outputs of oxalate, calcium, and magnesium in children with intestinal disorders. Potential cause of renal calculi. *Arch Dis Child* 1976;51:790-5.

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Successful treatment after 'drowning' in sand

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SUMMARY A 30 month old boy who aspirated a large amount of dirty sand was successfully resuscitated and made a full recovery.

Sand and dirt aspiration as a result of accidental burial may be massive and fatal despite intensive treatment including intubation and bronchoscopy.^{1 2} Conservative treatment in sand aspiration has also been proposed.³ We present a case of a young child

who 'drowned' in a sand box at kindergarten and was successfully resuscitated.

Case report

A 30 month old boy, who had been previously healthy, was found lying prone in the sand box of his kindergarten shortly after he had been seen playing there. He was cyanotic and gasping with his mouth completely full of sand. He was immediately rushed to our hospital while receiving mouth to mouth ventilation by a passing nurse. In the emergency room he was found to be comatose, with normal size pupils reacting to light, and he was severely cyanotic with a weak and rapid pulse. He was ventilated first by face mask and then through an endotracheal tube. His mouth, pharynx, and larynx were packed with sand and small stones which had to be removed with forceps so as to make the intubation possible. He was transferred while ventilated to the operating room and an emergency bronchoscopy was performed. The child was initially deeply cyanosed and the chest barely moved despite high pressure ventilation through the bronchoscope. Large amounts of sand were removed with forceps from the trachea and main bronchi. Every lobar bronchus was also

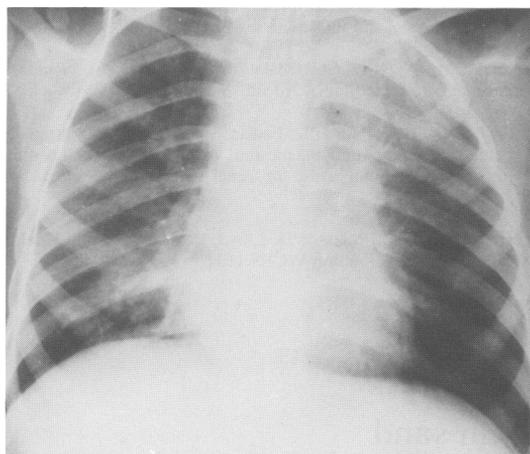


Figure Chest radiograph of the patient after bronchoscopy.

plugged. The sand was removed by repeated washings. As each lobar orifice was cleaned the chest moved more and the colour improved. After the bronchoscopy the endotracheal tube was left in place for a day and large amounts of sand were removed by suctioning.

The chest radiograph (figure) after the bronchoscopy showed outlining of the left bronchial tree by sand ('bronchogram'). The child was treated with steroids for two days after the bronchoscopy without preventive antibiotic treatment and the recovery was uneventful. The child had intensive chest physiotherapy for one week and was seen later in our respiratory clinic without any complaints and with a normal chest radiograph.

Discussion

In Israel there are 33 fatal cases of asphyxia in children per year. This accounts for 24% of all fatal accidents in children.

Sand boxes in kindergartens are very common. Although they carry the risk of accidental sand aspiration it is very unusual, and to our knowledge this is the only serious case reported in Israel. It was impossible to find any clues to explain why this boy suffered this unusual accident. It may be very important, however, to permit young children to play in sand boxes only under the supervision of their teachers.

In the present case the initial mouth to mouth resuscitation most probably saved his life but also impacted the aspirated sand bolus further inside the lungs. What is remarkable is the total recovery despite the massive aspiration of dirty sand.

References

- ¹ Bergeson PS, Hirschcliff WA, Crawford RF, *et al.* Asphyxia secondary to massive dirt aspiration. *J Pediatr* 1978;**92**:506-7.
- ² Van Dyke JJ, Lake KB. Survival after asphyxia secondary to gravel aspiration. *Arch Intern Med* 1976;**136**:471-3.
- ³ Bender EM, Kashuk JL. Conservative management of sand aspiration: case report. *Milit Med* 1984;**149**:98-9.

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