The Old and Enigmatic

Farah Nadrah Mohd Nasir[1], Rohazly Ismail[1]

[1] Radiology Department, Hospital Tunku Azizah Kuala Lumpur

INTRODUCTION

- Neuroblastoma is the most common solid extracranial tumour in infants and children.[1]
- The presenting signs and symptoms of neuroblastoma are highly variable with a broad spectrum. They commonly present with a mass related to the site of primary tumour, however the presenting complaint may also be related to presence of metastases or any associated paraneoplastic syndromes. Clinicians may not be aware of the atypical manifestations of this tumour.[2]

CASE 1

A 4-year old-girl initially presented with right thigh pain and antalgic gait. Further history revealed intermittent fever for 3 months. Right femur radiograph showed no fracture or joint dislocation. She again presented the following month with contralateral thigh pain and fever. Septic work-up and connective tissue disease screening returned negative. USG showed no definite sign of septic arthritis. She was initially suspected to have osteomyelitis, however MRI showed a large lobulated enhancing paraspinal masses, encasing the aorta and bilateral iliac arteries, with multiple pelvic and femoral bone metastases, as well as evidence of intertrochanteric left femur pathological fracture.

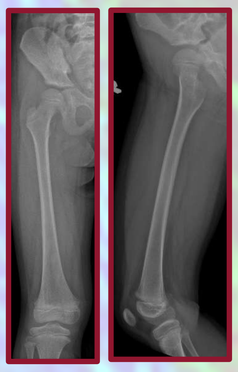

Figure 1: Initial radiographs of the right femur shows a normal right hip joint and no cortical lesion in the right femur.

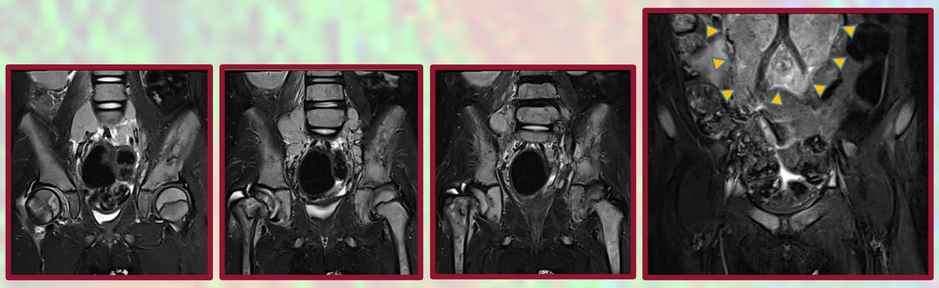

Figure 2: Abnormal heterogeneous signal intensities of the pelvic and femoral bones. Disruption of the normal alignment of the intertrochanteric left femur in keeping with fracture. Incidental finding of lobulated paraspinal mass encasing the aorta and bilateral iliac arteries (arrowheads).

DISCUSSION

- Neuroblastoma arises from primitive neuroblasts of the embryonic neural crest and can occur anywhere within the sympathetic nervous system, most common being in the abdomen (65%) with half of these tumours arising from the adrenal medulla. Other common sites of neuroblastoma include the neck, chest and pelvis.[3]
- Physicians have been aware of this disease for more than 150 years, since first described as a “glioma” by Rudolph Virchow. It was first termed “neuroblastoma” by James Homer Wright in 1910.[3,4]
- Yet this disease remains an enigmatic medical entity; some tumours disappear spontaneously without any therapy, while others progress with a fatal outcome despite the implementation of maximal modern therapy.[5]
- Early skeletal metastases may be missed when cortical destruction is not demonstrable on imaging.[2] Case 1 was initially misdiagnosed as septic arthritis as she presented with joint pain with concurrent fever.
- Neuroblastoma also has an unexplained tendency to metastasise to bony orbit, resulting in periorbital ecchymosis and proptosis.[2]
- Localised tumour may also present with paraneoplastic syndromes. Secretion of Vasoactive Intestinal Peptide can result in diarrhoea, as seen in Case 3.[2] Diarrhoea usually resolves after tumour removal.[6]
- Unfamiliarity with the less typical presentations of this common childhood malignancy may lead to delay in diagnosis and patient management.

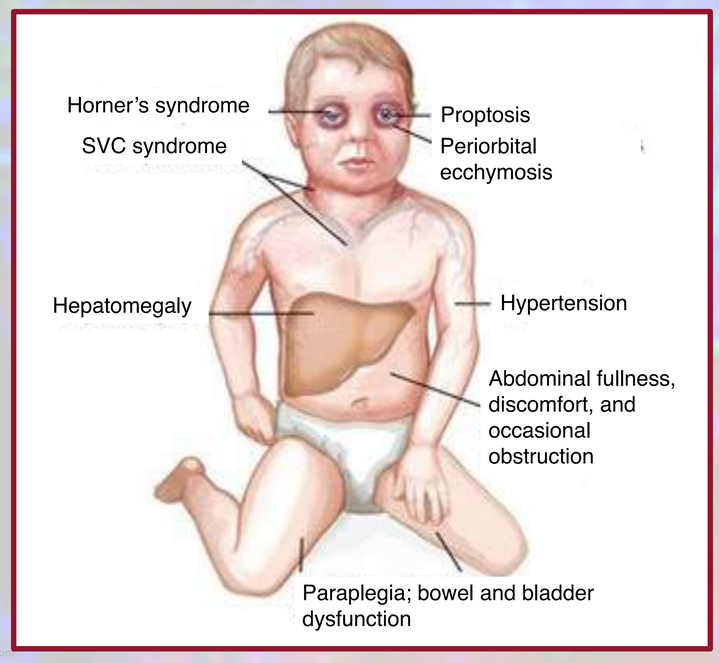

Figure 6: Some classic clinical presentations of neuroblastoma.[7]

CASE 2

Upon hospital admission for acute bronchiolitis, an 8-month-old girl was incidentally noted to have periorbital ecchymosis. Follow-up noted worsening ecchymosis and hepatomegaly. Blood investigation revealed severe anaemia. USG Abdomen showed multiple liver lesions and a right suprarenal mass suggestive of neurbolastoma. CT staging showed further extensive distant metastases to skull vault and facial bones and lymph nodes.

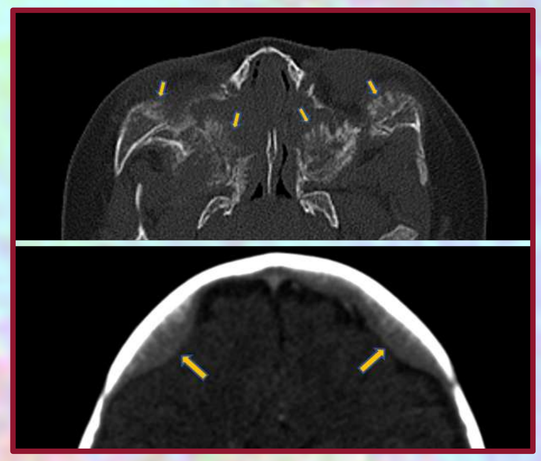

Figure 3: The classical “hair-on-end” appearance for skull bone metastases in neuroblastoma.

CASE 3

A 2-year-old boy had recurrent hospital admission chronic diarrhea and failure to thrive. He had no fever, abdominal pain, steatorrhea, hematochezia or melaena. Further history noted polydipsia, polyuria as well as hypertension. Laboratory markers revealed severe hypokalaemia, hypophosphataemia and hypochlorinaemia. Initial differential diagnosis included lactose intolerance and inflammatory bowel disease. His bowel habit did not improve despite multiple change of milk formula. An USG was arranged to look for evidence of bowel wall thickening, however a right suprarenal mass with intrabdominal lymphadenopathy was noted. The patient underwent tumour excision and HPE was consistent with ganglioneuroma.

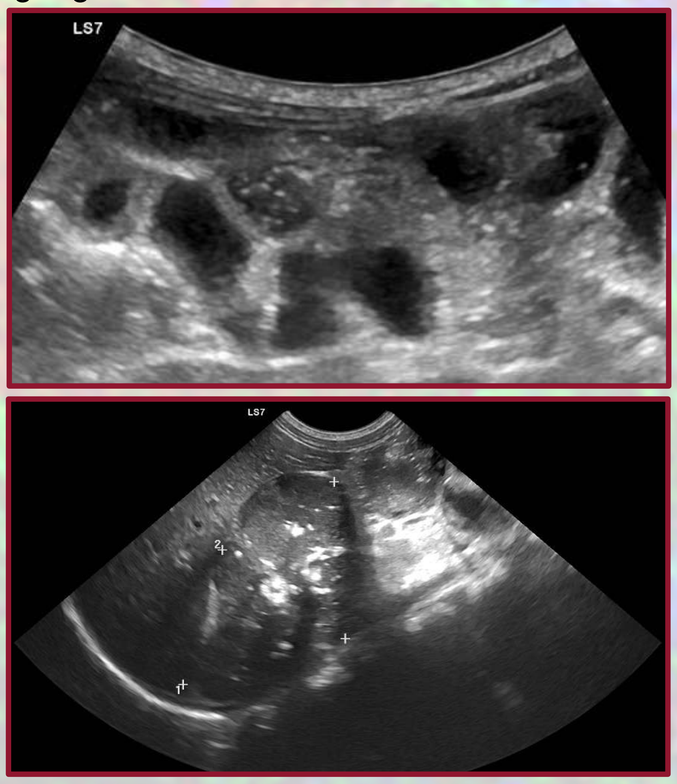

Figure 4: Normal bowel morphology on USG. Incidental findings of a heterogeneous right suprarenal mass.

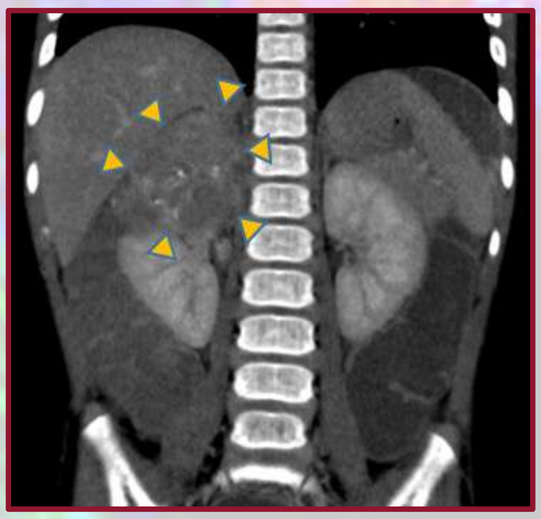

Figure 5: CECT Abdomen showed heterogeneous lobulated right suprarenal mass (arrowheads), with foci of calcifications consistent with neuroblastoma. .

CONCLUSION

Awareness of the unusual clinical presentation of neuroblastoma in children is prudent, as prompt diagnosis and treatment may help to increase survival rates and minimize complications.

ACKNOWLEDGEMENT

We gratefully acknowledge the Director of Hospital Tunku Azizah, the National Medical Research Register and the Director General of Health, Malaysia for permission to conduct and present this case series.

REFERENCES

1. David R, Lamki N,Fan S,Singleton EB,Eftekhari F,Shirkhoda A, et al. The many faces of neuroblastoma. *Radiographics* 1989;9:859–82.
2. Chu CM, Rasalkar DD, Hu YJ, et al. Clinical presentations and imaging findings of neuroblastoma beyond abdominal mass and a review of imaging algorithm. *Br J Radiol.* 2011;84(997):81-91. doi:10.1259/bjr/31861984
3. Cheung, Nai-Kong V., and Susan L. Cohn, et al. “Neuroblastoma.” Pediatric Oncology (2005)
4. Rothenberg, A.B., Berdon, W.E., D’Angio, G.J. et al. Neuroblastoma—remembering the three physicians who described it a century ago: James Homer Wright, William Pepper, and Robert Hutchison. *Pediatr Radiol* **39,** 155–160 (2009). https://doi.org/10.1007/s00247-008-1062-z
5. Brisse HJ, McCarville MB, et al. International Neuroblastoma Risk Group Project. Guidelines for imaging and staging of neuroblastic tumors: consensus report from the International Neuroblastoma Risk Group Project. *Radiology.* 2011 Oct;261(1):243-57. doi: 10.1148/radiol.11101352. Epub 2011 May 17. PMID: 21586679
6. Kaplan SJ, Holbrook CT, et al. Vasoactive intestinal peptide secreting tumors of childhood. Am J Dis Child. 1980 Jan;134(1):21-4. doi: 10.1001/archpedi.1980.02130130013005. PMID: 6101297
7. Image from: https://clinicalgate.com/neuroblastoma-8/#f0015