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Kingella kingae hand and wrist tenosynovitis in young children

Dear Sir,

Kingella kingae tenosynovitis of the hand and wrist is a poorly recognized condition in paediatrics with scarce data in the medical literature (Lironi et al., 2017). To improve the knowledge of this disease and help guide diagnostic and therapeutic strategies, we report a retrospective case series of ten children from three tertiary care children's hospitals in France, Israel and Switzerland.

Medical charts from six boys and four girls with a mean age of 12.1 (SD 5.6) months (range 6–22) were reviewed. Penetrating injury, bites or adjacent infection were not reported in any patient. Eight in nine children had viral infections in the preceding month. Upon admission, five in eight patients had temperature $\geq 38^{\circ}\text{C}$. Diagnosis of tenosynovitis was made by the presence of at least one Kanavel sign. All children had oedema, swelling and erythema over the infected sites (Figure 1a). The range of motion of the affected sites ranged from none to severe limitation. The median duration from the onset of symptoms to the clinical diagnosis was of 2.1 days (range 1–5). The extensor sides of the hand and wrist were the most commonly involved, affecting five and two children, respectively. In five children, the disease involved multiple tendons (Table 1).

The white blood cell count was normal in nine children. The mean C-reactive protein level was 32 (SD 25.9) mg/L and was elevated in six of eight children.

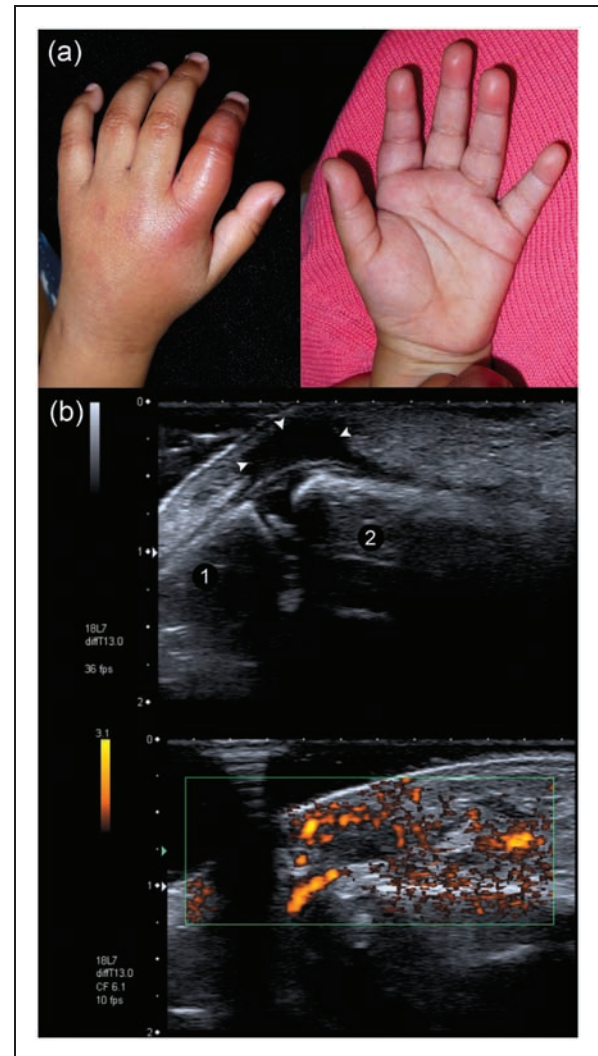


Figure 1. (A) Fusiform swelling and erythema over the left index finger and hand in case 7. The palmar surface is intact. (B) Ultrasound demonstrated subcutaneous fluid collection over the metacarpophalangeal joint of the left index finger (arrowheads, top) and extensor tendons hyperemia at colour Doppler (bottom). 1: second proximal phalanx; 2: second metacarpal bone.

Ultrasound imaging of the extensors demonstrated inflammatory tendon changes and subcutaneous fluid collections over the hand and metacarpophalangeal joints (Figure 1b). MRI was performed in five children and revealed diffuse oedema and increased fluid within the tendon sheaths. Needle aspiration or surgical drainage were performed in six children (Table 1). *Kingella kingae* was identified by culture of tenosynovial fluid in two children, whereas all blood cultures were negative. When performed, real-time polymerase chain reaction assays targeting *K. kingae* was positive on tenosynovial fluid in 4/4 children, on blood in 1/3 children and on oropharyngeal specimen in 7/7 children.

Table 1. Demographic features of the paediatric population with *Kingella kingae* tenosynovitis of the hand and wrist in our case series and results of diagnostic tests.

Case no.	Country	Age (months)	CRP (mg/L)	Viral infection the preceding month	WBC (per mm ³)	Imaging	Affected anatomic sites	Surgical procedure	Diagnostic investigations					Diagnostic status
									Blood cultures	Cultures on TS fluid	Real-time PCR on TS fluid	Real-time PCR on blood	Real-time PCR on oropharynx	
1	Switzerland	8	68	Respiratory viral infection	13,300	MRI	Extensor pollicis longus, abductor pollicis longus, extensor carpi radialis longus, extensor radialis brevis	Needle aspiration	-	-	+	NP	+	Confirmed
2	Switzerland	9	28	Respiratory viral infection	16,600	MRI	Flexor tendon sheath of the ring finger	Surgical drainage	-	-	+	NP	+	Confirmed
3	Switzerland	19	32	Respiratory viral infection	12,000	MRI	Flexor tendon sheath of the index finger	Needle aspiration	-	-	+	NP	+	Confirmed
4	Switzerland	22	<10	Respiratory viral infection	12,900	MRI	Flexor tendon sheaths of the index, middle and ring fingers	None	-	NA	NA	NP	+	Highly presumed
5	Switzerland	18	41	Respiratory viral infection	12,900	MRI	Extensor pollicis longus, extensor carpi radialis longus, extensor radialis brevis	None	-	NA	NA	NP	+	Highly presumed
6	France	11	26	Hand-foot-mouth disease	24,000	US	Extensor digitorum communis of the index, middle and ring fingers, extensor indicis proprius	None	-	NA	NA	-	+	Highly presumed
7	France	12	1	Hand-foot-mouth disease	8900	US	Extensor digitorum communis of the index, middle and ring fingers, extensor indicis proprius	None	-	NA	NA	+	+	Confirmed

(continued)

Table 1. Continued

Case no.	Country	Age (months)	CRP (mg/L)	Viral infection the preceding month	WBC (per mm ³)	Imaging	Affected anatomic sites	Surgical procedure	Diagnostic investigations					
									Blood cultures	Cultures on TS fluid	Real-time PCR on TS fluid	Real-time PCR on blood	Real-time PCR on oropharynx	Diagnostic status
8	France	8	68	None	12,500	US	Extensor digitorum communis	Surgical drainage	-	-	+	-	NP	Confirmed
9	Israel	6	...	Respiratory viral infection	15,700	...	Flexor tendon sheath of the index finger	Needle aspiration	-	+	NP	NP	NP	Confirmed
10	Israel	8	...	...	16,900	...	Flexor tendon sheaths of the index, middle, ring and little fingers, flexor pollicis longus, flexor pollicis brevis	Needle aspiration	-	+	NP	NP	NP	Confirmed

CRP: C-reactive protein; WBC: white blood cell count; TS: tenosynovial fluid; PCR: specific polymerase chain reaction targeting *Kingella kingae*; MRI: magnetic resonance imaging; US: ultrasonography; NP: not performed; NA: not applicable; ...: data not available.

Empiric intravenous antibiotic therapy with drugs covering classical pyogenic bacteria and *K. kingae* was given for a mean of 4.5 (SD 1.3) days, followed by oral amoxicillin or cefuroxime for a mean of 16.6 (SD 5.4) days. The postoperative course was uneventful in five in six children, whereas one required repeat drainage. Infection resolved in all cases with no digital stiffness.

Kingella kingae is a pathogen of low virulence which is recognized as the prime aetiology of osteoarticular infections in young children from Western countries [Yagupsky, 2015]. Because *K. kingae* is notoriously fastidious and patients frequently present with mild clinical and laboratory findings, diagnosis is easily missed. *Kingella kingae* is carried in the oropharynx among 8–12% of healthy European and Israeli children aged 6–48 months [Yagupsky, 2015], which is a prerequisite for invasive disease which is commonly triggered by viral infections [El Houmami et al., 2015]. Because the detection of *K. kingae* in the oropharynx of ill children has a positive predictive value of 91% for *K. kingae* infection [Ceroni et al., 2013], the index of presumptive diagnosis among non-operated cases was thereby high.

Kingella kingae tenosynovitis of the hand and wrist should be highly suspected in any child aged 6–48 months with tenosynovitis, recent viral infection and no prior penetrating injury to the hand. The detection of *K. kingae* from tenosynovial fluid or blood confirms the diagnosis and is facilitated by using molecular tools [Yagupsky, 2015]. Administration of amoxicillin or cefuroxime for 10–15 days coupled with appropriate surgical management typically results in good outcome with no sequelae.

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