

When the Fever Persists: Takayasu Arteritis Masquerading as Refractory Kawasaki Disease in a 3-Year-Old

Background: Takayasu arteritis (TAK) is rare in young children and can mimic refractory Kawasaki disease (KD), leading to diagnostic delay. We present a 3-year-old male with recurrent fevers and systemic inflammation initially diagnosed as atypical KD, ultimately found to have diffuse large- and medium-vessel vasculitis consistent with TAK.

Case Presentation:

History: A previously healthy, unvaccinated 3-year-old boy presented with his sixth hospitalization over three months for recurrent fevers. His illness began with respiratory distress, followed by multiple admissions for pneumonia with persistent fevers and elevated inflammatory markers. He was treated for atypical Kawasaki disease with two courses of IVIG and high-dose aspirin after developing coronary artery dilation. His course was complicated by pelvic abscess requiring surgical drainage and pericardial effusion progressing to tamponade requiring urgent pericardiocentesis. Despite IVIG and high-dose corticosteroids, fevers recurred within days of completing steroid taper. He presented with ill appearance, persistent daily fevers, and new-onset severe hypertension.

Physical Exam: Ill-appearing and fatigued. Blood pressure 111/62, heart rate 134. Cardiac exam with normal heart sounds, no murmurs. Respiratory, abdominal, skin, and neurologic exams unremarkable. Genitourinary exam notable for healing surgical sites from prior abscess drainage. No mucocutaneous findings typical of KD.

Diagnostic Evaluation: Laboratory studies revealed leukocytosis with neutrophilia and lymphopenia (WBC 23.6 K/ μ L), microcytic anemia (Hgb 7.0 g/dL), extreme thrombocytosis (platelets 1,686 K/ μ L), severe hypoalbuminemia (1.7 g/dL), hypocalcemia, markedly elevated CRP ($\geq$ 317 mg/L), and hyperferritinemia (926 ng/mL). Soluble IL-2 receptor was elevated. Extensive infectious workup was unrevealing, including blood/urine cultures, Karius cell-free DNA testing, viral panels, Bartonella, fungal serologies, Histoplasma, TB testing, and hepatitis panel; pericardial fluid cultures were sterile. PET scan (11/21) demonstrated cervical, mediastinal, and hilar lymphadenopathy with low-level FDG avidity. CT and MR angiography revealed **multifocal stenoses, aneurysmal changes, and wall thickening** involving coronary arteries, aorta, celiac trunk, superior mesenteric artery, renal arteries, vertebral arteries, carotid arteries, and intracranial vessels—findings diagnostic of large-vessel vasculitis.

Differential Diagnosis: Hemophagocytic lymphohistiocytosis (HLH) was considered given hyperferritinemia and elevated soluble IL-2 receptor; however, only 3 of 8 diagnostic criteria were met. Leukemia was excluded by negative peripheral blood flow cytometry. Lymphoma was unlikely given only mildly enlarged lymph nodes with low FDG avidity and absence of

bulky lymphadenopathy or hepatosplenomegaly. Monogenic vasculitides (DADA2, CGD with secondary vasculitis) remain considerations pending genetic evaluation.

Diagnosis: **Takayasu arteritis** with diffuse large- and medium-vessel involvement.

Treatment and Outcome: Failure of multiple IVIG courses, rapid relapse after steroid taper, severe hypertension, and progressive inflammation prompted escalation to **high-dose methylprednisolone and intravenous cyclophosphamide**, resulting in fever resolution and sustained clinical improvement. The patient was discharged on steroid taper with close rheumatology, cardiology, and nephrology follow-up.

Conclusion: This case underscores the diagnostic challenge of distinguishing refractory Kawasaki disease from systemic large-vessel vasculitis in young children. Key red flags prompting vascular imaging included: (1) failure of two IVIG courses, (2) rapid relapse after steroid taper, (3) new-onset severe hypertension, and (4) multisystem inflammation beyond typical KD features. Early recognition of Takayasu arteritis in children labeled as "refractory KD" is critical, as timely aggressive immunosuppression may prevent irreversible end-organ damage including stroke, renovascular hypertension, and cardiac ischemia. Genetic evaluation for monogenic vasculitides should be considered in atypical presentations.

Keywords: Takayasu arteritis, Kawasaki disease, pediatric vasculitis, large-vessel vasculitis, refractory Kawasaki, pericardial tamponade, renovascular hypertension