DIAGNOSIS OF VIRAL INFECTIONS USING MYXOVIRUS RESISTANCE PROTEIN A (MxA)

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ABSTRACT

BACKGROUND: Myxoma resistance protein A (MxA) is induced during viral infections. MxA testing could be helpful to differentiate between viral and bacterial infections.

METHODS: A prospective multicenter cohort study was performed in pediatric emergency departments. MxA blood values were measured in children with confirmed viral or bacterial infections, uninfected controls, and infections of unknown origin. First patients were used to determine MxA threshold for viral infection. The diagnostic performance of MxA was determined by using receiver operating characteristic (ROC) analysis. Sensitivities (Se), specificities (Sp), and positive and negative likelihood ratios (LR+, LR-) were calculated.

RESULTS: The study included 553 children; 44 uninfected controls and 77 confirmed viral infections (mainly respiratory syncytial virus and rotavirus) were used to determine an MxA threshold at 200 ng/mL. In the 193 other patients with confirmed infections and uninfected controls (validation group), MxA was significantly higher in patients with viral than in those with bacterial infections and uninfected controls (P, .0001). The area under the ROC curve (AUC) were 0.98, with 96.4% Se and 85.4% Sp, for differentiating uninfected from virus-infected patients and 0.89, with 96.4% Se and 66.7% Sp, for differentiating bacterial and viral infections. MxA levels were significantly higher in patients with clinically diagnosed viral versus clinically diagnosed bacterial infections (P, .001). Some patients with *Streptococcus pneumoniae* infections had high MxA levels. Additional studies are required to elucidate whether this was due to undiagnosed viral coinfections.

CONCLUSION: MxA is viral infection marker in children, at least with RSV and rotavirus. MxA could improve the management of children with signs of infection.

Distinguishing between viral and bacterial infections in children is difficult based only on clinical or routinely available biological findings. Diagnostic uncertainty leads to unnecessary antibiotic therapy which results in the development of antimicrobial resistance, and also causes avoidable hospitalization.

C-reactive protein (CRP) has been used in routine practice to help physicians rule in or rule out bacterial infections however there is an overlap of CRP values between children with bacterial and viral infection.

Myxovirus resistance protein A (MxA) is a protein induced during viral infections and could be used as a specific marker of viral infection which could be particularly useful in clinical settings where viral infections are frequent.

This large prospective study in a pediatric population confirms the usefulness of MxA for diagnosing viral infections in children consulting the emergency department. MxA levels were significantly higher in patients with viral infection than in patients with bacterial infection or uninfected controls.

An elevated MxA level could predict a viral infection and facilitate the decision not to treat with antibiotics. However, combining MxA detection with a marker specific for bacterial infection e.g. CRP or procalcitonin, could allow more reliable differentiation between viral and bacterial infections.

A combination of CRP and MxA allows clear differentiation of patients with viral infection from those with bacterial infections. High MxA levels and low CRP levels would allow exclusion of bacterial infection and confirm viral infection.

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