Adrenal insufficiency in Multisystem Inflammatory Syndrome in Children (MIS-C) – Case Report

**BACKGROUND**

- Endocrine manifestations are extremely rare in MIS-C secondary to COVID 19 virus.
- Common endocrine manifestations are diabetes mellitus, autoimmune thyroiditis.
- We present an uncommon endocrine dysfunction manifesting as primary adrenal insufficiency in a MIS-C patient.

**CASE REPORT – Admission**

- 5-year-old previously healthy boy
- 2 days of fever, sore throat, headache, lethargy, vomiting and diarrhea.
- Multiple family members were sick in the preceding month.
- Patient recently received COVID-19 vaccine preceding month.
- 2 days of fever, sore throat, headache, lethargy, vomiting and diarrhea.

**Pertinent labs**

- **Serum Sodium** 133 mmol/L
- **Serum Glucose** 10 mg/dL
- **Serum Cortisol** (4.8-19.5 µg/dL) 2.5 µg/dL

**Initial treatment**

- Fluid bolus
- Dextrose bolus
- Stress dose steroids
- Stabilized blood pressure and glucose with the above-mentioned therapies

**CASE REPORT – Hospital Course**

- Patient continued to have borderline blood pressures.
- Additional work up undertaken.
- Endocrine work up

<table>
<thead>
<tr>
<th>Endocrine studies</th>
<th>MISC</th>
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<tbody>
<tr>
<td>Serum Cortisol * (&gt;14 µg/dL)</td>
<td>5.8 µg/dL</td>
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<td>ACTH level (N: 7.2-63.3 pg/mL)</td>
<td>1.8 pg/mL</td>
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<tr>
<td>Dehydroepiandrosterone (&lt; 85.3 µg/dL)</td>
<td>&lt; 10.5 µg/dL</td>
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<td>Aldosterone (&lt;36 ng/dL)</td>
<td>&lt;3 ng/dL</td>
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<tr>
<td>Adrenal antibodies</td>
<td>Negative</td>
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<tr>
<td>Computed tomography</td>
<td>Normal adrenals</td>
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</tbody>
</table>

**Inpatient management**

- Stress dose Hydrocortisone: weaned to physiologic dosing
- Fludrocortisone added as borderline low blood pressures.

**Outpatient follow up with Endocrine at 3 months:**

- Stable blood pressures, normal glucose on physiologic hydrocortisone dosing
- Fludrocortisone: weaning

**DISCUSSION**

- Adrenal insufficiency is a rare occurrence in MIS-C.
- Only 2 case reports in literature (one with secondary adrenal insufficiency and second with primary adrenal insufficiency due to autoimmune process).
- Pathophysiology of adrenal insufficiency in patients in COVID-19 infection remains unexplained – commonly proposed theories include direct viral invasion or extensive cytokine induced damage of adrenal gland.

**REFERENCES**


**CONCLUSION**

- Adrenal insufficiency does occur in MIS-C patients.
- Concomitant hypoglycemia, hyponatremia and hypotension in a MIS-C patient warrants adrenal insufficiency evaluation.

**NEXT STEPS**

- Long term follow up to differentiate transient vs permanent adrenal gland damage.
- Further studies needed to investigate adrenal insufficiency in MIS-C.

**CONTACT INFORMATION**

Meghana Kovvuri, MD
Email ID: kovvurm@ccf.org