Clinical Features and Outcomes of Dengue Fever and COVID-19 Coinfection in Children from a Tertiary Hospital:

A CASE SERIES

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Introduction & Significance

- Dengue fever is an arthropod-borne viral illness that has been endemic in the Philippines since 1954
- The recent COVID-19 pandemic has caused multiple hospitalizations, severe disease, and even patient demise
- Studies have found that coinfection could present with more severe symptoms compared to the usual asymptomatic or subclinical presentation of each illness
- Dengue fever and COVID-19 coinfection, especially in the pediatric population, has not yet been intensively studied
- Recognition of coinfection will allow physicians to perform the most appropriate management that would lead to the best outcome

Objectives

GENERAL

- To present a series of cases involving COVID-19 and dengue fever coinfection in pediatric patients (0-18 years old) diagnosed and managed in a tertiary hospital in the Philippines

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SPECIFIC

- To determine the (1) **demographics**, (2) **history of present illness**, (3) **past medical history**, (4) **clinical course and hospital management**, and (5) **clinical outcomes** of pediatric patients (0-18 years old) with COVID-19 and dengue fever coinfection from a tertiary hospital in the Philippines

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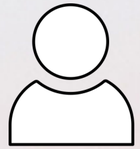
Methodology

RESEARCH DESIGN

Retrospective observational design
Case series

SAMPLING SIZE

Total population sampling → **24 compiled cases**



STUDY POPULATION

Pediatric patients (0-18 years old) from a tertiary hospital in the Philippines **(+) Dengue NS1 antigen** and/or **(+) Anti-dengue IgM** **(+) SARS-CoV-2 RT-PCR** from January 1, 2021 to August 31, 2023

Results

DEMOGRAPHICS

- Sex: **Males (66.7%)** > Females (33.3%)
- Age: **School-aged children (5-12 years old, 54.2%)** > Toddlers (1-2 years old, 16.7%) > Preschoolers (3-4 years old) & Teenagers (13-17 years old) (12.5% each) > Infants (3-11 months, 4.2%)
    - Youngest was a *9-month old infant*
- Nutritional status: Most were **underweight (54.2%)**

PAST MEDICAL HISTORY

- Most common comorbidity: **Asthma (12.5%)**
    - *Relatively longer hospital stay (i.e. 7 days)*
- Eight out of 24 had a **previous history of dengue (33.3%)**
    - *Relatively longer hospital stay (i.e. 2-8 days)*

Results

LABORATORY TESTS

Common features:

- **(+) Dengue NS1 Antigen (54%)** > (+) Anti-Dengue IgM (25%) > Both positive (20%)
- CBC: **Leukopenia** [1.57-4.02 x 10^3/uL (83.3%)] > **Thrombocytopenia** [20,000-136,000/uL (62.5%)] > **High hematocrit** [42-48.1% (54.2%)]
  - Differential count: **Decreasing segmenters and increasing lymphocytes** (91.7%) > **Monocytosis** [7-21% (95.8%)] > **Eosinophilia** [3-7% (33.3%)]
- **Deranged bleeding parameters** (PT/PTT) in **almost half (47.1%)**

- Additional tests done only for some patients (e.g. CRP, AST, ALT, ESR, urinalysis)

Results

SIGNS & SYMPTOMS

- Most common symptom: **Fever (100%)** > Decrease in appetite (50%) > Rash (41.7%)
  - Febrile illness lasted from 3-9 days (average of 5.3 days)

- Most common PE findings: **Rash (41.7%)** > **Tachycardia (37.5%)** > Hyperactive Bowel Sounds, Abdominal Tenderness, Cervical Lymphadenopathy (12.5% each)

Results

MANAGEMENT

- **Dengue fever warning signs in 58%**
  - Most common: **Abdominal pain & decreasing platelet with increasing hematocrit (25% each**), Epistaxis (16.7%), Persistent vomiting (12.5%)
- COVID-19 Severity: **Mild (95.8%)** > Moderate (4.2%)
  - No severe cases
  - No oxygen supplementation or signs of respiratory distress

- **Mostly supportive treatment**
- **Intravenous fluid hydration given in 95.8%** (23/24) - 1 refused
- **Antibiotics given in 33.3%** (8/24) – Co-Amoxiclav or Azithromycin

- Hospital stay: **2-8 days, average of 4.75 days**
- Common features in those with longer hospital stay**: fever, leukopenia, thrombocytopenia**
- Disposition: **Discharged (95.8%)** > DAMA (4.2%)
  - All patients had improved clinical status on discharge; no mortalities
  - Patient who opted DAMA was well on ff-up with normal labs

Conclusion

- **Males** more affected than females, mostly **school-aged children (5-12 years old)**
- Majority had **no comorbid conditions**
  - Those with comorbidities (i.e. asthma, allergic rhinitis, PCOS) did not have a particularly more remarkable hospital course
- Most common symptoms: **fever, decrease in appetite,** and **rash**
- Most common signs: **rash** and **tachycardia**
- Most common CBC findings: **leukopenia, thrombocytopenia,** and **high hematocrit**
- Hospital stay ranged from **2-8 days,** at an **average of 4.75 days**
- **Most only had mild symptoms**, except for one moderate COVID-19 case with pneumonia
- **Coinfection with the two viruses will not necessarily lead to more severe outcomes**

Limitations & Recommendations

- Limitations of this study include the **variations in the laboratory testing and management**
- **Further, more controlled studies** could be conducted for more accurate and precise results
- There have been reports of **serological cross-reactivity** complicating the diagnosis of dengue fever and COVID-19 infection
  - Future studies should use the **gold standards for testing** of both infections to lessen the likelihood of false positives