ASSESSING THE MULTISTEP APPROACH FOR *CLOSTRIDIOIDES DIFFICILE* INFECTION DIAGNOSIS

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BACKGROUND

- *Clostridioides difficile* infection (CDI) is a spore-forming anaerobic Gram-positive bacillus and the leading cause of nosocomial infectious diarrhea.
- 2017 IDSA/SHEA *C. difficile* guidelines recommend a multistep algorithm approach for CDI diagnosis.
- Algorithm entails stool testing via enzyme-linked immunosorbent assay (EIA) for glutamate dehydrogenase (GDH) and *C. difficile* toxins A/B (Tox).
- Discordant samples are arbitrated by nucleic acid amplification test (NAAT) for tcdB gene.
- GDH EIA has sensitivities >90%, while Tox EIA has sensitivities ranging from 50-90%.

OBJECTIVE

- Evaluate the diagnostic performance of GDH and Tox EIA using the multistep algorithm as the gold standard.

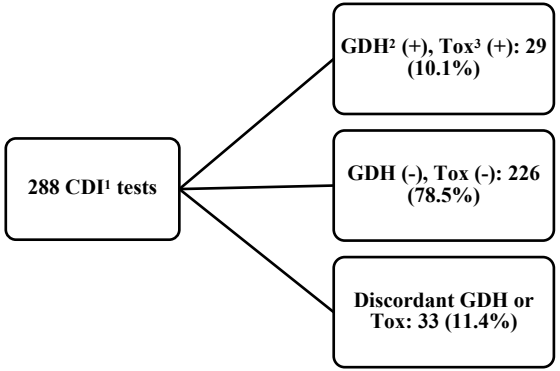
METHODS

STUDY DESIGN

- **Type study:** Secondary analysis of an inpatient dataset collected
- **Subjects:** Adults ≥ 18-years old from Princeton Baptist Medical Center (Birmingham, AL) tested for *C. difficile*
- **CDI tests:** Alere TechLab *C. difficile* Quik Chek Complete® was used to determine GDH and Tox EIA, and Alethia *C. difficile* DNA Amplification Assay®, a NAAT, for discordant samples.
- **CDI case:** Positive for Tox and GDH, or positive of either Tox or GDH in addition to positive NAAT.
- Retesting within the same admission was allowed.

RESULTS

FIGURE 1: PATIENT DISTRIBUTION



[1] CDI: *Clostridioides difficile* infection, [2] GDH: Glutamate dehydrogenase enzyme-linked immunosorbent essay, [3] Tox: Toxin enzyme-linked immunosorbent essay

TABLE 1: CDI CASE DISTRIBUTION PER GDH AND TOXIN

Test	CDI[1] (+)	CDI (-)	Total
GDH EIA[2] (+)	47	14	61
GDH EIA (-)	1	226	227
Tox EIA[3] (+)	30	0	30
Tox EIA(-)	18	240	258
Total	48	240	288

[1] CDI: *Clostridioides difficile* infection, [2] GDH: glutamate dehydrogenase enzyme-linked immunosorbent assay, [3] Toxin EIA: toxin enzyme-linked immunosorbent assay

RESULTS

TABLE 2: TEST PERFOMANCE CHARACTERISTICS

Test	Se[3]	Sp[4]	PPV[5]	NPV[6]
GDH EIA[1]	97.9%	94.2%	77.1%	99.6%
Tox EIA[2]	62.5%	100%	100%	93%

[1] GDH: glutamate dehydrogenase enzyme-linked immunosorbent assay, [2] Toxin EIA: toxin enzyme-linked immunosorbent assay, [3] Se: sensitivity, [4] Sp: Specificity, [5] PPV: positive predictive value, [6] NPV: negative predictive value.

CONCLUSIONS

- Taking the multistep algorithm as a gold standard, the performance characteristics of GDH and Tox are concordant to previous descriptions in the literature, with GDH being highly sensitive and Tox being highly specific.
- A diagnostic algorithm lacking GDH and NAAT would miss over one-third of CDI cases.
- A diagnostic algorithm lacking Tox and NAAT could potentially overdiagnose about one-fifth of tested patients.

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