

Title:

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Authors:

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Clinical manifestations of Meckel's diverticulum and analytical distinction with appendicitis: a 20-year diagnostic study

Julio César Moreno-Alfonso^{1,2}; Carlos Delgado-Miguel^{3,4}; Sara Hernández Martín¹; Ada Molina Caballero¹; Alberto Pérez Martínez¹; María Concepción Yáñez Irazábal^{2,5}

1: Pediatric Surgery Department. Hospital Universitario de Navarra. Calle Irunlarrea, 3. C.P. 31008. Pamplona, Navarra; Spain.

2: Doctoral School of Health Sciences. Universidad Pública de Navarra (UPNA). Pamplona, Navarra; Spain.

3: Pediatric Surgery Department. Hospital Universitario Fundación Jiménez Díaz, Avenida de los Reyes Católicos, 2. C.P. 28040. Madrid; Spain.

4: Institute for Health Research IdiPAZ, La Paz University Hospital. C.P. 28046. Madrid; Spain.

5: General and Digestive Surgery Department. Hospital Universitario de Navarra. Calle Irunlarrea, 3. C.P. 31008. Pamplona, Navarra; Spain.

Corresponding author

Julio César Moreno-Alfonso, MD PhD(c)

Pediatric Surgery Department. Hospital Universitario de Navarra. Pamplona, Navarra; Spain

Doctoral School. Universidad Pública de Navarra (UPNA). Pamplona, Navarra; Spain

ORCID: 0000-0002-0414-2888

Irunlarrea Street, 3. P.C. 31008. Pamplona, Navarra; Spain

juliomoreno.md@gmail.com

Abstract

While approximately 90% of Meckel's diverticula are asymptomatic, they can manifest with a wide spectrum of complications with a mortality rate of 0.001%. The differential diagnosis is broad, with appendicitis being the main consideration when diverticulitis is the presenting symptom. This study aims to characterize a population with symptomatic Meckel's diverticulum and to investigate the utility of cellular indices in its differential diagnosis with

appendicitis. A diagnostic study was conducted encompassing patients aged 0-15 years who underwent surgery for symptomatic Meckel's diverticulum between 2002 and 2023 at a pediatric hospital.

Keywords: Meckel diverticulum. Diverticulitis. Biomarkers. Appendicitis. Abdominal pain.

Conflict of interest and funding: None to declare.

Dear Editor,

While approximately 90% of Meckel's diverticula are asymptomatic, they can manifest with a wide spectrum of complications with a mortality rate of 0.001% (1). The differential diagnosis is broad, with appendicitis being the main consideration when diverticulitis is the presenting symptom (2). This study aims to characterize a population with symptomatic Meckel's diverticulum and to investigate the utility of cellular indices in its differential diagnosis with appendicitis. A diagnostic study was conducted encompassing patients aged 0-15 years who underwent surgery for symptomatic Meckel's diverticulum between 2002 and 2023 at a pediatric hospital (No. 3318-0000200). Additionally, a comparative group of patients with appendicitis (AA) and non-surgical abdominal pain (NSAP) was randomly selected during the same period, in a 1:2:2 ratio (Meckel's diverticulitis [MD]:AA:NSAP), to contrast analytical variables. The neutrophil-to-lymphocyte ratio (NLR) and platelet-to-lymphocyte ratio (PLR) were calculated as the number of neutrophils and platelets divided by the number of lymphocytes, respectively. The derived neutrophil-to-lymphocyte ratio (dNLR) was obtained from the ratio of the number of neutrophils to the difference between the number of leukocytes and the number of neutrophils. Diagnostic accuracy of these parameters was assessed using ROC curve. Twenty-eight patients operated on for symptomatic diverticula were included (age 6.8 years \pm 4.8). Diverticulitis was the main presentation (43%) with volvulus being the most infrequent (3.5%). Comparison of patients with diverticulitis (n=12) and appendicitis (n=24) revealed that dNLR had the highest precision to differentiate between these two diseases, with a cut-off point of 5.21, AUC of 0.747 and OR of 66.8 (p 0.006). Analysis comparing AA (n=24), MD (n=12), and NSAP (n=24)

groups, showed again that dNLR was the best parameter for analytical discrimination between AA and MD[&] (**Table 1**). A systematic review involving over 600 patients with Meckel's diverticulum reported that the most common presentation was obstruction (41%), while diverticulitis (13%) was less frequent (3). Our findings differ, as MD was the primary presentation (43%). Regarding cellular indices, dNLR showed the best profile in differentiating between NSAP, AA, and MD. Unfortunately, we have not been able to contrast our results, since this is the first study that addressed this issue. Therefore, prospective and multicenter studies are necessary to validate these results. However, in our experience, MD emerges as the primary presentation of this embryological remnant, contrasting with literature where bleeding prevails. Its key differential diagnosis is appendicitis, where dNLR may prove useful in distinguishing between the two pathologies.

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Table 1. Demographic, clinical, and analytical characteristics of the symptomatic Meckel's diverticulum, acute appendicitis (AA), and Meckel's Diverticulitis (MD) population. Discriminatory capacity and multiple comparisons analysis of neutrophils, NLR, dNLR, and PLR among patients with AA, MD, and non-surgical abdominal pain (NSAP).



	Symptomatic Meckel's Diverticulum (n=28)
Age (y-o)	6.9 IQR 8.6
Female / Male	14.3% (n=4) / 85.7% (n=24)
Diverticulitis (n / %)	12 / 42.9%
Lower gastrointestinal bleeding (n / %)	9 / 32.1%
Ileocolic intussusception (n / %)	5 / 17.9%
Intestinal obstruction (n / %)	1 / 3.6%
Volvulus (n / %)	1 / 3.6%
Perforation (n / %)	7 / 25%
Gastric mucosa (n / %)	18 / 64.3%
Leukocytes	12,840 cells/mm ³ ± 5260
Lymphocytes	2574 cells/mm ³ IQR 1836
Neutrophils	9307 cells/mm ³ ± 5425
Platelets	364,814 cells/mm ³ IQR 168,113
NLR	6.075 IQR 5.74
dNLR	3.66 IQR 3.02
PLR	208.1 IQR 182.6

	AA (n=24)	MD (n=12)	p Value
Age (y-o)	11.2 IQR 3.9	8.5 ± 4.4	0.347
Female n (%) - Male n (%)	7 (29.2%) - 17 (70.8%)	2 (16.7%) - 10 (83.3%)	0.414
Weight (kg)	41.3 ± 18.2	33.5 ± 18.9	0.236
Perforation n (%)	3 (12.5%)	5 (41.7%)	0.047
Leukocytes	13,500 cells/mm ³ IQR 7000	14,958 cells/mm ³ ± 3995	0.737

AUC ROC: Area under the Receiver Operating Characteristic Curve; **95%CI:** 95% Confidence Interval; **IQR:** Interquartile range; **PPV:** Positive Predictive Value; **NPV:** Negative Predictive Value; **OR:** Odds Ratio.

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