

# Non-invasive CD

by Mohammed Khorshid

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## General metrics

**12,713**

characters

**1,825**

words

**155**

sentences

**7 min 17 sec**reading  
time**14 min 2 sec**speaking  
time

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## Score



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## Writing Issues

**56**

Issues left

**9**

Critical

**47**Advanced

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## Plagiarism

This text hasn't been checked for plagiarism

## Writing Issues

25

### Clarity

10

Passive voice misuse



6

Intricate text



9

Wordy sentences



20

### Correctness

1

Misplaced words or phrases



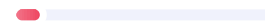
6

Determiner use (a/an/the/this, etc.)



1

Incomplete sentences



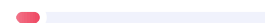
5

Punctuation in compound/complex sentences



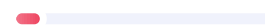
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Text inconsistencies



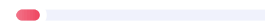
1

Improper formatting



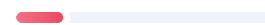
1

Wrong or missing prepositions



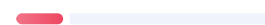
2

Comma misuse within clauses



2

Misspelled words



11

### Engagement

11

Word choice



## Unique Words

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39%

unique words

## Rare Words

**38%**

Measures depth of vocabulary by identifying words that are not among the 5,000 most common English words.

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rare words

## Word Length

**5.3**

Measures average word length

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characters per word

## Sentence Length

**11.8**

Measures average sentence length

words per sentence

# Non-invasive CD

Non-invasive diagnosis of Crohn's Disease: all that glitters is not gold

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Conflict of Interest:

No funding was received<sup>1</sup> for this article. All authors have no conflicts to  
disclose.

Crohn's disease (CD) is a chronic inflammatory condition that affects any part  
of the alimentary tract, characterized by the development of fistulas or  
strictures(1). CD has non-specific symptoms and commonly shared symptoms  
with other disorders such as ulcerative colitis. This<sup>2</sup> makes the diagnosis of CD

challenging with many patients, especially those with mild and moderate activity. The diagnosis of CD <sup>3</sup> is based on clinical, histological, and laboratory findings. The gold standard <sup>4</sup> method for diagnosing CD is histopathology. Other diagnostic modalities are either used for evaluating the disease activity after histopathological confirmation or for monitoring the response of treatment (2) Table 1. However, histopathology is not always definitive, and even reaching the site of inflammation for taking biopsies is not always <sup>5</sup> feasible. Differentiation from other causes of small intestinal inflammation (e.g., Lymphomas, Behçet Disease, and Tuberculosis) is crucial as immunosuppression induced by CD therapies may aggravate those conditions and have more on the patient with the unnecessary risk of serious adverse events. This <sup>6</sup> highlights the necessity of having various imaging modalities to confirm the diagnosis of CD. Lately, there have been numerous emerging tools and technology that could be used <sup>7</sup> to diagnose CD. Under this austere environment, an accurate technique with minimal contact with the patient yet maintaining the accuracy of diagnosis <sup>8</sup> to provide a definitive diagnosis remains vital.

### Biopsies

On one hand <sup>9</sup>, taking biopsies from the inflammation site is an excellent technique when it is accessible. The inflamed area has to be accessible and lies in the upper endoscopy (including early jejunum), colonoscopy (including the terminal part of the ileum), and during surgical exploration of complicated cases. However, if the inflammation is in the less accessible areas of the small intestine by upper endoscopy or colonoscopy, especially when surgical <sup>10 11</sup> exploration is not indicated <sup>12</sup>. Therefore, taking a biopsy might not be convenient, and using another modality is needed. In this case, the use of a device-assisted enteroscopy (DAE) is mandatory (3). DAE has an outstanding advantage which <sup>13</sup> allows deeper intubation of the small intestine. However, it is

of limited availability due to the prolonged examination time and carries an increased risk of perforation, especially in the situation of markedly inflamed ulcerated mucosa. They are mostly found<sup>14</sup> in tertiary hospitals, and limited availability results in harboring long queues, which delays the diagnosis of such cases.

Video Capsule Endoscopy (VCE) is by now taking a more prominent role in the detection of small intestinal lesions and monitoring disease progression. Its increased availability, straightforward interpretation, high-quality imaging, simplicity, and most importantly, non-invasiveness of the procedure. VCE became one of the modalities highly recommended in the ECCO guidelines(4). Nevertheless, the limited use is due to the inability to take biopsies, relatively high cost, and the fear of retention when in doubt of strictures. Esaki et al. (5) conducted a nationwide case-control study that illustrated the presence of distinctive signs for CD that may ease the diagnosis without the need for biopsy. Cobblestoning (cobblestone appearance), many longitudinal ulcers and erosions, and circumferential and longitudinal diminutive lesions.

Magnetic resonance enterography (MRE) recently became a commonly used diagnostic tool for CD. Development of explicit criteria of evaluation and the emergence of the Magnetic Resonance Index of Activity (MaRIA). MaRIA is an improved scoring system that provides a more accurate assessment of the disease insult to the intestines and reduces complications, making MRE an essential tool for assessing the patients' condition (6). Although MRE avoids the operator-dependent bias with the abdominal ultrasound of the bowel, MRE has few drawbacks like the process of the procedure that may not be tolerated

by the patient, the availability of the machine, and the experience of the operator and interpreter.<sup>15</sup>

Since the time of the patient's presentation, and all through the patient journey, few laboratory tests aid the process of evaluation. During the diagnosis phase and on follow-up, the importance of CRP, calprotectin,<sup>17</sup> CBC, and Ferritin, are regularly requested and are proven to picture the disease activity(7). Other tests are also ordered<sup>18</sup> on different occasions, like Albumin, Vitamin D, ASCA, and stool analysis. These tests are essential to raise the doubt for CD diagnosis, evaluate the disease activity, and monitor the response to treatment.<sup>19</sup>

Away from the guidelines and the current literature recommendations, and to win some time until the CD diagnosis is proven when the treating physician is in significant doubt, many physicians tend to start a treatment trial and judge the response. This treatment trial includes initiation of glucocorticoids in lower than recommended doses for treatment of active CD; however, although we see this in our regular practice, to our knowledge, it was never documented in a scientific publication. The concept of steroid trial is imitated from rheumatologists and dermatologists when treating suspected immune disorders, and also when patients with inflammatory bowel disease present the with extra-intestinal manifestations.<sup>20</sup><sup>21</sup>

During the early months of the COVID-19 pandemic, healthcare services for non-emergency patients were less reachable(8). Patients' access to endoscopy was reserved<sup>22</sup> for those who had alarming signs only. At our center, Crohn's and Colitis Egypt (private clinic), we received 12 cases referred to us from various

healthcare facilities all over Egypt who <sup>23</sup> were diagnosed and treated for CD without histopathologic evidence. Of these, <sup>24</sup> 6 cases were already receiving steroids, <sup>25</sup> 4 cases had a combination of steroids and 5-ASA, and <sup>26</sup> 2 cases <sup>27</sup> added to them azathioprine. Upon completing their diagnostic profile searching for a suspicious site with signs of CD either by MRE or further by endoscopic modalities, only 1 case of the 12 was found CD, and the other 11 were <sup>28</sup> totally free. The <sup>29</sup> cases who were free were diagnosed with <sup>30</sup> IBS-D, after stopping immunosuppression and re-evaluating them <sup>31</sup> 3 months later.

To conclude, <sup>32</sup> health care system has been under severe stress from the current pandemic. COVID-19 has put <sup>33</sup> a lot of restrictions on asking patients to go to <sup>34</sup> hospital and avoid the prolonged time spent to the limit. Patients have to be asked for <sup>35</sup> a very precise procedure and only for crucial emergencies. CD is not characterized <sup>36</sup> with specific symptoms and can be mistaken with other bowel disorders, <sup>37</sup> as, CD shares a lot of <sup>38</sup> symptoms with them. Various imaging modalities have been well-established and used in diagnosing CD. However, they can be a bit risky, <sup>39</sup> therefore, using a safer technique of combined ones could be our go-to at the time being. Having a confirmed diagnosis is of utmost importance to provide the right treatment. The diagnosis of CD is sometimes not accessible due to the need for histopathologic confirmation before <sup>40</sup> induction of treatment. Histopathology has limitations both in occasions difficulty in taking a biopsy and the tentative diagnosis. In the guarantee of the high diagnostic value of other modalities, such as MRE and VCE, combining <sup>41</sup> both of them and supporting them with laboratory tests may decrease the need for histopathology in diagnosing CD. Future research may fulfill this strong demand by developing a model for non-invasive diagnoses of CD. The potential of having a non-invasive technique could not only be promising for an austere



time but also more comfortable and less stressful for patients over regular biopsies and other invasive methods.

Table 1 Accuracy of currently used diagnostic modalities

Tool

Study

n=

Sensitivity

Specificity

VCE

Monteiro et al. (9)

36

90%

100%

MRE (MaRIA)

Roseira et al. (10)

84

90%

98%

CRP

Mosli et al. (11)

2499

49%

92%

Calprotectin

Rokkas et al. (12)

2822

82.4%

72.1%

This table illustrated the distinct modalities used in different studies. It also demonstrates the number of cases that were recruited<sup>42</sup> for the study<sup>43</sup>. On this basis, the sensitivity and specificity were calculated<sup>44</sup>. The study<sup>45</sup> by Rokkas et al. using Calprotectin<sup>17</sup> had the largest number of patients. However, it represents the lowest percentage of specificity. On the other hand, Monteiro et. al used<sup>46</sup> VCE<sup>47</sup> shown highest<sup>48</sup> percentages<sup>49</sup> of both sensitivity and specificity.

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1.	<i>No funding was received</i>	Passive voice misuse	Clarity
2.	<i>This</i>	Intricate text	Clarity
3.	<i>is based</i>	Passive voice misuse	Clarity
4.	<del>gold standard</del> → standard gold	Misplaced words or phrases	Correctness
5.	<del>always</del> → still	Word choice	Engagement
6.	<i>This</i>	Intricate text	Clarity
7.	<i>be used</i>	Passive voice misuse	Clarity
8.	diagnosis's accuracy	Wordy sentences	Clarity
9.	<del>On one hand</del> → On the one hand	Determiner use (a/an/the/this, etc.)	Correctness
10.	<i>is not indicated</i>	Passive voice misuse	Clarity
11.	<i>However, if the inflammation is in the less accessible areas of the small intestine by upper endoscopy or colonoscopy, especially when surgical exploration is not indicated.</i>	Intricate text	Clarity
12.	<del>.Therefore</del> → , therefore	Incomplete sentences	Correctness
13.	, which	Punctuation in compound/complex sentences	Correctness
14.	<i>are mostly found</i>	Passive voice misuse	Clarity
15.	<i>Although MRE avoids the operator-dependent bias with the abdominal ultrasound of the bowel, MRE has few drawbacks like the process of the procedure that may not be tolerated by the patient, the availability of the machine, and the experience of the operator and interpreter.</i>	Intricate text	Clarity

16.	<del>the time of</del>	Wordy sentences	Clarity
17.	<i>calprotectin; Calprotectin</i>	Text inconsistencies	Correctness
18.	<i>are also ordered</i>	Passive voice misuse	Clarity
19.	<i>These tests are essential to raise the doubt for CD diagnosis, evaluate the disease activity, and monitor the response to treatment.</i>	Intricate text	Clarity
20.	<del>the with</del>	Determiner use (a/an/the/this, etc.)	Correctness
21.	<i>The concept of steroid trial is imitated from rheumatologists and dermatologists when treating suspected immune disorders, and also when patients with inflammatory bowel disease present the with extra-intestinal manifestations.</i>	Intricate text	Clarity
22.	<i>was reserved</i>	Passive voice misuse	Clarity
23.	<i>were diagnosed</i>	Passive voice misuse	Clarity
24.	<del>cases</del> → patients, points, subjects, issues	Word choice	Engagement
25.	<del>cases</del> → patients, points	Word choice	Engagement
26.	<del>cases</del> → instances	Word choice	Engagement
27.	<del>to them</del>	Wordy sentences	Clarity
28.	<del>totally</del>	Wordy sentences	Clarity
29.	<del>cases</del> → patients, subjects, issues	Word choice	Engagement
30.	IBS-D,	Punctuation in compound/complex sentences	Correctness
31.	3 → three	Improper formatting	Correctness

32.	the health	Determiner use (a/an/the/this, etc.)	Correctness
33.	a lot of → many	Wordy sentences	Clarity
34.	the hospital, or a hospital	Determiner use (a/an/the/this, etc.)	Correctness
35.	a very precise → an exact	Word choice	Engagement
36.	with → by	Wrong or missing prepositions	Correctness
37.	as,	Punctuation in compound/complex sentences	Correctness
38.	symptoms → signs	Word choice	Engagement
39.	, therefore → ; therefore, . Therefore	Punctuation in compound/complex sentences	Correctness
40.	treatment → therapy	Word choice	Engagement
41.	both of	Wordy sentences	Clarity
42.	were recruited	Passive voice misuse	Clarity
43.	study → task	Word choice	Engagement
44.	were calculated	Passive voice misuse	Clarity
45.	study → survey	Word choice	Engagement
46.	et al → et al.	Comma misuse within clauses	Correctness
47.	used → . Used, ; used	Punctuation in compound/complex sentences	Correctness
48.	the highest	Determiner use (a/an/the/this, etc.)	Correctness

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49.	<del>percentages</del> → rates	Word choice	Engagement
50.	<del>database</del> → Database	Misspelled words	Correctness
51.	<del>Intest</del> → Interest	Misspelled words	Correctness
52.	<del>in</del>	Wordy sentences	Clarity
53.	<del>and</del>	Wordy sentences	Clarity
54.	disease,	Comma misuse within clauses	Correctness
55.	the reclassification, or a reclassification	Determiner use (a/an/the/this, etc.)	Correctness
56.	<del>that</del> parallels	Wordy sentences	Clarity

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