

Non-invasive CD

by Mohammed Khorshid

General metrics

12,713

characters

1,825

words

155

sentences

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

Score



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Writing Issues

56

Issues left

9

Critical

47Advanced

Plagiarism

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Writing Issues

25

Clarity

10

Passive voice misuse



6

Intricate text



9

Wordy sentences

**20**

Correctness

1

Misplaced words or phrases



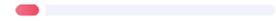
6

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



1

Incomplete sentences



5

Punctuation in compound/complex sentences



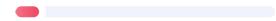
1

Text inconsistencies



1

Improper formatting



1

Wrong or missing prepositions



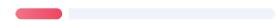
2

Comma misuse within clauses



2

Misspelled words

**11**

Engagement

11

Word choice



Unique Words

Measures vocabulary diversity by calculating the percentage of words used only once in your document

39%

unique words

Rare Words**38%**

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

rare words

Word Length**5.3**

Measures average word length

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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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. This² makes the diagnosis of CD

challenging with many patients, especially those with mild and moderate activity. The diagnosis of CD is based³ on clinical, histological, and laboratory findings. The gold standard⁴ 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 always⁵ 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. This⁶ 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 used⁷ to diagnose CD. Under this austere environment, an accurate technique with minimal contact with the patient yet maintaining the accuracy of diagnosis⁸ to provide a definitive diagnosis remains vital.

Biopsies

On one hand⁹, 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 exploration is not indicated^{10 11}. Therefore¹², 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 which¹³ 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 found¹⁴ 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.¹⁵

Since the time of¹⁶ 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, calprotectin¹⁷, CBC, and Ferritin, are regularly requested and are proven to picture the disease activity(7). Other tests are also ordered¹⁸ 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.¹⁹

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 the²⁰ with extra-intestinal manifestations.²¹

During the early months of the COVID-19 pandemic, healthcare services for non-emergency patients were less reachable(8). Patients' access to endoscopy was reserved²² 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 were diagnosed²³ and treated for CD without histopathologic evidence. Of these, 6 cases²⁴ were already receiving steroids, 4 cases²⁵ had a combination of steroids and 5-ASA, and 2 cases²⁶ added to them²⁷ 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 totally²⁸ free. The cases²⁹ who were free were diagnosed with IBS-D³⁰, after stopping immunosuppression and re-evaluating them 3³¹ months later.

To conclude, health³² care system has been under severe stress from the current pandemic. COVID-19 has put a lot of³³ restrictions on asking patients to go to hospital³⁴ and avoid the prolonged time spent to the limit. Patients have to be asked for a very precise³⁵ procedure and only for crucial emergencies. CD is not characterized with³⁶ specific symptoms and can be mistaken with other bowel disorders, as³⁷, CD shares a lot of symptoms³⁸ with them. Various imaging modalities have been well-established and used in diagnosing CD. However, they can be a bit risky, therefore³⁹, 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 induction of treatment⁴⁰. 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 both of them⁴¹ 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 recruited⁴² for the study⁴³. On this basis, the sensitivity and specificity were calculated⁴⁴. The study⁴⁵ by Rokkas et al. using Calprotectin¹⁷ had the largest number of patients. However, it represents the lowest percentage of specificity. On the other hand, Monteiro et. al used⁴⁶ VCE⁴⁷ shown highest⁴⁸ percentages⁴⁹ of both sensitivity and specificity.

References:

1. Gade AK, Douthit NT, Townsley E. Medical Management of Crohn's Disease. Cureus [Internet]. 2020 May 29;12(5):e8351–e8351. Available from: <https://pubmed.ncbi.nlm.nih.gov/32617224>
2. Novak G, Parker CE, Pai RK, MacDonald JK, Feagan BG, Sandborn WJ, et al. Histologic scoring indices for evaluation of disease activity in Crohn's disease. Cochrane database⁵⁰ Syst Rev [Internet]. 2017 Jul 21;7(7):CD012351–CD012351. Available from: <https://pubmed.ncbi.nlm.nih.gov/28731502>
3. Kim M, Jang HJ. The role of small bowel endoscopy in small bowel Crohn's disease: when and how? Intest⁵¹ Res [Internet]. 2016/06/27. 2016 Jul;14(3):211–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/27433142>
4. Maaser C, Sturm A, Vavricka SR, Kucharzik T, Fiorino G, Annese V, et al. ECCO-ESGAR Guideline for Diagnostic Assessment in⁵² IBD Part 1: Initial

diagnosis, monitoring of known IBD, detection of complications. J Crohn's Colitis [Internet]. 2019 Feb 1;13(2):144-164K. Available from: <https://doi.org/10.1093/ecco-jcc/jjy113>

5. Esaki M, Matsumoto T, Ohmiya N, Washio E, Morishita T, Sakamoto K, et al. Capsule endoscopy findings for the diagnosis of Crohn's disease: a nationwide case-control study. J Gastroenterol [Internet]. 2018/09/15. 2019 Mar;54(3):249–60. Available from: <https://pubmed.ncbi.nlm.nih.gov/30219994>

6. Coimbra AJF, Rimola J, O'Byrne S, Lu TT, Bengtsson T, de Crespigny A, et al. Magnetic resonance enterography is feasible ⁵³and reliable in multicenter clinical trials in patients with Crohn's ⁵⁴disease, and may help select subjects with active inflammation. Aliment Pharmacol Ther [Internet]. 2016 Jan 1;43(1):61–72. Available from: <https://doi.org/10.1111/apt.13453>

7. Cappello M, Morreale GC. The Role of Laboratory Tests in Crohn's Disease. Clin Med Insights Gastroenterol [Internet]. 2016 Jan 1;9:CGast.S38203. Available from: <https://doi.org/10.4137/CGast.S38203>

8. Khorshid M, Bakheet N, Abdallah S, Essam M, Cordie A. COVID-19: A Strong Call for Remote Medicine In IBD. J Dig Dis [Internet]. 2020 Sep 4;n/a(n/a). Available from: <https://doi.org/10.1111/1751-2980.12935>

9. Monteiro S, Castro FD de, Carvalho PB, Rosa B, Moreira MJ, Pinho R, et al. Essential role of small bowel capsule endoscopy in ⁵⁵reclassification of colonic inflammatory bowel disease type unclassified. World J Gastrointest Endosc. 2017;

10. Roseira J, Ventosa AR, de Sousa HT, Brito J. The new simplified MARIA score applies beyond clinical trials: A suitable clinical practice tool for Crohn's disease ⁵⁶that parallels a simple endoscopic index and fecal ¹⁷calprotectin. United Eur Gastroenterol J [Internet]. 2020 Jul 14;2050640620943089. Available from: <https://doi.org/10.1177/2050640620943089>

11. Mosli MH, Zou G, Garg SK, Feagan SG, MacDonald JK, Chande N, et al. C-Reactive Protein, Fecal Calprotectin, and Stool Lactoferrin for Detection of Endoscopic Activity in Symptomatic Inflammatory Bowel Disease Patients: A Systematic Review and Meta-Analysis. *Off J Am Coll Gastroenterol | ACG* [Internet]. 2015;110(6). Available from: https://journals.lww.com/ajg/Fulltext/2015/06000/C_Reactive_Protein,_Fecal_Calprotectin,_and_Stool.10.aspx
12. Rokkas T, Portincasa P, Koutroubakis I. Fecal Calprotectin in Assessing Inflammatory Bowel Disease Endoscopic Activity: a Diagnostic Accuracy Meta-analysis. *J Gastrointest Liver Dis* [Internet]. 2018 Sep 30;27(3 SE-Systematic Review and Meta-Analysis). Available from: <https://www.jgld.ro/jgld/index.php/jgld/article/view/63>

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.	gold standard → standard gold	Misplaced words or phrases	Correctness
5.	always → 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.	On one hand → 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.	.Therefore → , 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.	the time of	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.	the with	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.	cases → patients, points, subjects, issues	Word choice	Engagement
25.	cases → patients, points	Word choice	Engagement
26.	cases → instances	Word choice	Engagement
27.	to them	Wordy sentences	Clarity
28.	totally	Wordy sentences	Clarity
29.	cases → 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

49.	percentages → rates	Word choice	Engagement
50.	database → Database	Misspelled words	Correctness
51.	Intest → Interest	Misspelled words	Correctness
52.	in	Wordy sentences	Clarity
53.	and	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.	that parallels	Wordy sentences	Clarity
