

International Journal of Clinical Medicine



ISSN : 2158-284X



<https://www.scirp.org/journal/ijcm>

Journal Editorial Board

ISSN: 2158-284X (Print) ISSN: 2158-2882 (Online)

<https://www.scirp.org/journal/ijcm>

Editor-in-Chief

Prof. Yong Sang Song Seoul National University, South Korea

Managing Executive Editor

Prof. Junming Liao Tulane University, USA

Editorial Board

Dr. Marc Afilalo McGill University, Canada
Prof. Sergio D. Bergese The Ohio State University Medical Center, USA
Prof. Siamak Bidel University of Helsinki, Finland
Prof. Trond Buanes University of Oslo, Norway
Prof. Long-Sheng Chang The Ohio State University, USA
Prof. Alex F. Chen University of Pittsburgh School of Medicine, USA
Dr. David Cheng University Hospital Case Medical Center, USA
Prof. Yunfeng Cui Tianjin Medical University, China
Prof. Noriyasu Fukushima International University of Health and Welfare, Japan
Prof. Matteo Gelardi University of Foggia (FG), Italy
Prof. Jeffrey L. Geller University of Massachusetts Medical School, USA
Prof. Kuruvilla George Peter James Centre, Australia
Prof. Karen Goodman Montclair State University, USA
Dr. Ramakrishnan Gopalakrishnan University of Southern California, USA
Prof. Gerard A. Hutchinson University of the West Indies, Trinidad-and-Tobago
Prof. Bharat K. Kantharia The University of Texas Health Science Center, USA
Prof. Shinya Kimura Saga University, Japan
Dr. Valery Leytin University of Toronto, Canada
Dr. Shaogang Ma Huai'an Hospital Affiliated to Xuzhou Medical College, China
Dr. Lawrence A. Mark Indiana University, USA
Dr. Edward P. Monico Yale University, USA
Dr. Asanghanwa Alahkala Milca Nkiebifu University of Bamenda, Cameroon
Dr. Pratheeshkumar Poyil University of Kentucky, USA
Prof. Rajamanickam Rajkumar Meenakshi Medical College, India
Dr. M. Waheed Roomi Dr. Rath Research Institute, USA
Prof. Krzysztof Roszkowski The F. Lukaszczyk Oncology Center, Poland
Dr. Ibrahim Sahin Erzincan Binali Yildirim University, Turkey
Prof. Zheng Su Genentech Inc., USA
Dr. Jue Wang University of Nebraska, USA
Dr. Weili Wang Case Western Reserve University, USA
Dr. Li Xu Northwestern University, USA

Table of Contents

Volume 13 Number 5

May 2022

Covid Pneumonitis Presenting as Intractable Hiccups

O. Ezeigwe, K. Hayat, A. Elgohary, S. Shahid..... 199

Ventral Hernia: An Innovative Grading System

F. Alghamdi..... 204

International Journal of Clinical Medicine (IJCM)

Journal Information

SUBSCRIPTIONS

The *International Journal of Clinical Medicine* (Online at Scientific Research Publishing, <https://www.scirp.org/>) is published monthly by Scientific Research Publishing, Inc., USA.

Subscription rates:

Print: \$79 per issue.

To subscribe, please contact Journals Subscriptions Department, E-mail: sub@scirp.org

SERVICES

Advertisements

Advertisement Sales Department, E-mail: service@scirp.org

Reprints (minimum quantity 100 copies)

Reprints Co-ordinator, Scientific Research Publishing, Inc., USA.

E-mail: sub@scirp.org

COPYRIGHT

Copyright and reuse rights for the front matter of the journal:

Copyright © 2022 by Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY).

<http://creativecommons.org/licenses/by/4.0/>

Copyright for individual papers of the journal:

Copyright © 2022 by author(s) and Scientific Research Publishing Inc.

Reuse rights for individual papers:

Note: At SCIRP authors can choose between CC BY and CC BY-NC. Please consult each paper for its reuse rights.

Disclaimer of liability

Statements and opinions expressed in the articles and communications are those of the individual contributors and not the statements and opinion of Scientific Research Publishing, Inc. We assume no responsibility or liability for any damage or injury to persons or property arising out of the use of any materials, instructions, methods or ideas contained herein. We expressly disclaim any implied warranties of merchantability or fitness for a particular purpose. If expert assistance is required, the services of a competent professional person should be sought.

PRODUCTION INFORMATION

For manuscripts that have been accepted for publication, please contact:

E-mail: ijcm@scirp.org

Covid Pneumonitis Presenting as Intractable Hiccups

Obinna Ezeigwe, Khizar Hayat, Ahmed Elgohary, Shahid Shahid

Department of the Care of the Elderly, East Kent Hospitals University NHS Foundation Trust, Ashford, UK

Email: obinna.ezeigwe@nhs.net

How to cite this paper: Ezeigwe, O., Hayat, K., Elgohary, A. and Shahid, S. (2022) Covid Pneumonitis Presenting as Intractable Hiccups. *International Journal of Clinical Medicine*, 13, 199-203.
<https://doi.org/10.4236/ijcm.2022.135016>

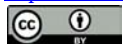
Received: April 13, 2022

Accepted: May 23, 2022

Published: May 26, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc. This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Background: Hiccups, also known as Singletus, can be a cause of worry and anxiety for most patients when persistent. It has long been associated with various infectious pathologies. Its association with SARS-COV-19 is relatively new with only a few cases reported so far. This case report highlights a unique presentation of Covid pneumonitis as intractable hiccups as the only symptom. With adequate laboratory and instrumental investigations, the aetiology was found to be Covid pneumonitis. Once the cause was detected and treatment initiated, the symptoms subsided. **Conclusion:** While hiccup can be a sign of various underlying chronic illnesses, its association with Covid-19 is relatively new with very few literatures reporting this finding. It is very crucial for clinicians to keep a high index of suspicion in patients presenting with hiccups.

Keywords

Intractable Hiccups, Covid-19, Ronapreve, Delta Variant

1. Introduction

Hiccup is a benign and self-limiting condition, usually not requiring any intervention. Described in most literatures as a brief contraction of the muscles of inspiration lasting seconds to minutes, terminating with sudden closure of the glottis [1] [2], it could be benign lasting <1 hour or intractable and persistent (days to years). Various causes of hiccups can be categorised as cardiovascular (myocardial infarction, pericarditis), post-operative, medications, psychogenic, toxic causes (alcohol, uraemia, electrolyte derangements), central nervous system disorders (head trauma, stroke, multiple sclerosis, AVM malformations) and vagus and phrenic nerve irritation [3] [4]. Covid-19 is a relatively new disease that primarily affects the respiratory system. Not much was known when it

emerged, but as cases continued to rise, several reports began to appear, describing its varied clinical presentation and multi-system involvement [5]. As of April 2020, there were over 8000 published cases of Covid-19 in several journals spanning the globe [6]. With its emergence in late 2019, the commonest symptoms reported were fatigue, myalgia, cough, shortness of breath, new loss of taste or smell, diarrhoea, and sore throat [5] [7]. There have been 11 documented cases of its association with intractable hiccups with most cases responding to medical intervention while a few did not require any intervention at all before abating [5]. This is a case of a 65-year-old independent man presenting with relentless hiccups which were the chief complaint. A very detailed history, examination and series of investigations revealed the underlying pathology.

2. Case Report

A 65-year-old gentleman was brought into the emergency department via ambulance due to a 5-day history of persistent and debilitating hiccups. 2 days prior, he felt generally unwell with fever and body aches. On presentation, he stated he had tried Gaviscon at home to ease his hiccups but with no effect. He reported no drug allergies.

He had a past medical history of ischaemic heart disease, type 2 diabetes mellitus, hypertension, central obesity, and obstructive sleep apnoea.

Upon admission, his hiccups persisted. His vital signs were, blood pressure 135/63, heart rate 109, respiratory rate 19 and afebrile. He was hypoxemic on admission, needing oxygen supplementation to maintain his saturations above 94%. On auscultation of chest there were bi-basal crepitations which were the only finding. Examination of other systems was unremarkable.

Chest X-ray showed widespread opacities bilaterally, predominantly in the middle and lower zones. In view of his increased supplemental oxygen requirement and chest X-ray findings, a CTPA (Computed Tomographic Pulmonary Angiogram) was done which ruled out pulmonary embolism but further demonstrated a patchy ground-glass shadowing signifying pneumonitis and an incidental finding of a pulmonary hamartoma.

Laboratory investigations demonstrated C-reactive protein of 20, leucocytosis 14,000 cells, raised lactate (2.1), and sodium of 133. Rest of the blood tests like urea, liver function test and troponin were normal. His Covid PCR test was positive for SARS-Cov-2 (Delta Variant). Covid antibody test demonstrated he was sero-negative for Anti-Covid IgG. Blood cultures done on admission showed no growth in aerobic or non-aerobic bottles.

As he was sero-negative for Anti Covid IgG, he received combination of neutralising monoclonal immunoglobulin of Casirivimab and imdevimab (Ronapreve) infusion according to NICE (National Institute for Health and care Excellence) recommendations for managing Covid-19 pneumonitis in hospital. This was in addition to standard dexamethasone treatment regimen. Within a few days of commencing treatment his hiccups resolved without any recurrence. Supple-

mental oxygen was gradually and successfully weaned off and patient was discharged back to his home to be seen in a respiratory clinic in 6 weeks. (**Figure 1** & **Figure 2**)

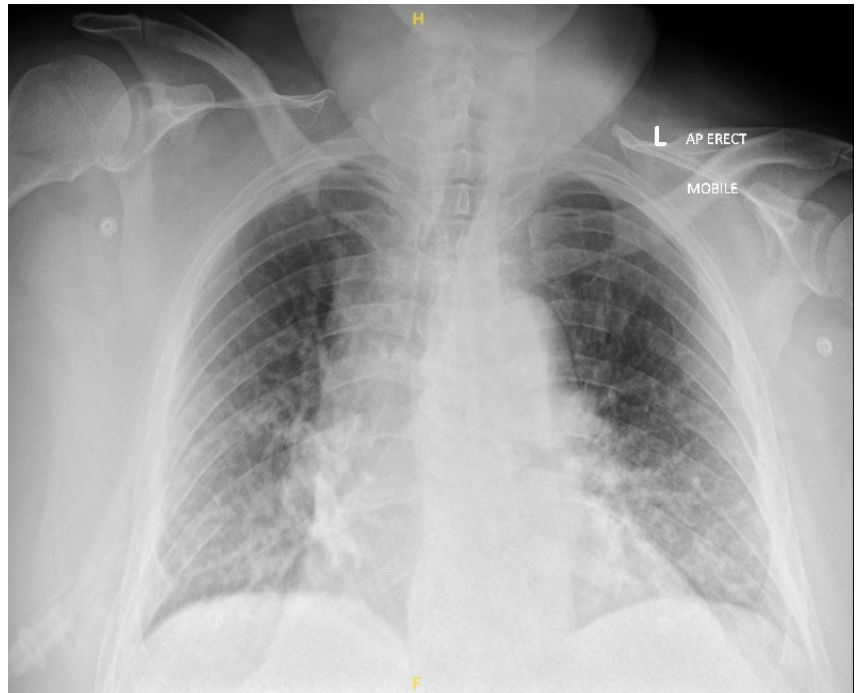


Figure 1. Chest X-ray demonstrating widespread opacities bilaterally, more predominant in the middle/lower zones.



Figure 2. CT chest showing peripheral ground glass opacities.

3. Discussion

Covid-19 was declared a pandemic on the 11th of March 2019 with over 200 countries in the world affected [3]. There are few literatures that have reported association of Covid-19 with intractable hiccups [3]. Here we look at the index case in our facility whose sole reason for presenting to hospital is the hiccups that persisted for days and became a cause for worry. But before this, understanding the hiccups reflex is a must to gain good insight into how pathological processes can lead to hiccups.

The hiccups reflex simply consists of the afferent, reflex centre, and efferent limb, all working in unison. Afferent impulses are transmitted to the hiccups centre (hypothalamus, brain stem and cervical spinal cord segments C3-C5) via the phrenic nerve and then to the efferent's consisting of (phrenic nerve, anterior scalene muscles, external intercostals and glottis [4].

Looking at the involvement of the bulk of the respiratory apparatus in the hiccups reflex, it won't come as a surprise as to how inflammatory processes of the respiratory system can lead to hiccups via irritation of the phrenic nerves or even by direct involvement of the structures themselves [4]. In some patients that present with hiccups, identifying the cause can be a challenge.

As far as we know, there have been only a handful of cases published so far of Covid-19 and its association with hiccups. There are so far a few similarities in that in most cases, hiccups were the presenting complaint prior to diagnosis of Covid pneumonitis and most patients were above 55 with multiple co-morbidities like hypertension and diabetes mellitus [4] [5]. Treatment and response varied with most receiving dexamethasone, baclofen, metoclopramide, chlorpromazine ivermectin and even azithromycin [5] [6]. Our patient got better days after treatment with monoclonal antibodies and dexamethasone. Whether his response was to the monoclonal antibodies administered or dexamethasone remains quite unclear. However, I believe the consensus is that a resolution of the infectious process could have led to improvement in symptoms, *i.e.*, hiccups. 6 weeks after his admission, he was followed up in the clinic and doing a lot better and back to his baseline.

4. Conclusion

Covid-19, a very new infection that has plagued the world since early 2020, has presented us medical professionals with varying degrees of challenges ranging from very unusual presentations to complications. Singultus (hiccups), even though benign, can be a serious cause of worry for some patients, and in most cases when persistent, can interfere with day-to-day activities. Its association with Covid-19 is relatively new. Therefore, maintaining a high index of suspicion is key to early triage and timely intervention.

Consent for Publication

A written consent was obtained from the patient for this publication.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Brañuelas Quiroga, J., et al. (2016) Hiccups: A Common Problem with Some Unusual Causes and Cures. *The British Journal of General Practice*, **66**, 584-586. <https://doi.org/10.3399/bjgp16X687913>
- [2] Kohse, E.K., Hollmann, M.W., Bardenheuer, H.J. and Kessler, J. (2017) Chronic Hiccups: An Underestimated Problem. *Anaesthesia & Analgesia*, **125**, 1169-1183. <https://doi.org/10.1213/ANE.0000000000002289>
- [3] de Sene, D.R., et al. (2021) Covid-19 Presenting as Persistent Hiccups: A Case Report. *Revista do Instituto de Medicina Tropical de Sao Paulo*, **63**, e62. <https://doi.org/10.1590/s1678-9946202163062>
- [4] Burdette, S.D. and Marinella, M.A. (2004) Pneumonia Presenting as Singultus. *Southern Medical Journal*, **97**, 915. <https://doi.org/10.1097/01.SMJ.0000125174.62424.C6>
- [5] Wang, D., et al. (2020) Clinical Characteristics of 138 Hospitalized Patients with 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. *JAMA*, **323**, 1061-1069. <https://doi.org/10.1001/jama.2020.1585>
- [6] Kousha, K. and Thelwell, M. (2020) Covid-19 Publications: Database Coverage. *Science Studies*, **1**, 1068-1091. https://doi.org/10.1162/qss_a_00066
- [7] Borku Uysal, B., et al. (2020) Case Report: A Covid-19 Patient Presenting with Mild Rhabdomyolysis. *The American Journal of Tropical Medicine and Hygiene*, **103**, 847-850. <https://doi.org/10.4269/ajtmh.20-0583>

Ventral Hernia: An Innovative Grading System

Fares Alghamdi

MBBS—Independent Researcher, Baljurashi, Saudi Arabia

Email: faresaresearch@gmail.com

How to cite this paper: Alghamdi, F. (2022) Ventral Hernia: An Innovative Grading System. *International Journal of Clinical Medicine*, 13, 204-211.

<https://doi.org/10.4236/ijcm.2022.135017>

Received: April 13, 2022

Accepted: May 23, 2022

Published: May 26, 2022

Copyright © 2022 by author(s) and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

Background: Ventral hernia is a complex and progressive condition that may lead to serious complications. However, no specified grading or classifying system is found to categorize the hernia, which leads to clinical complexities and may affect the patient outcome. **Aim:** The general aim of this paper is to build up an easy and comprehensive grading system to categorize ventral hernia. **Methodology:** By carrying out a secondary search over clinical presentation, physical examination, and imaging studies of ventral hernia, a valid grading system is developed. **Results:** Hanoon's grading system is composed of seven grades, grades 1, 2A, 2B, 3A, 3B, 3C, and 4. Each grade entailed different clinical presentations, imaging characteristics, and progressivity of ventral hernia. **Conclusion:** Hanoon's grading system for ventral hernia can be used to solve the clinical complexities of ventral hernia. Also, it can be a step forward in hernia research to build upon.

Keywords

General Surgery, Hernia, Classification, Grading

1. Introduction

Hernia is a condition that occurs at the abdominal site when an organ is pushed into the tissue area because of weakness. The hernia has complicated understanding and different types such as diaphragmatic, umbilical, ventral, and inguinal [1] [2] [3]. The complexity leads to the difficulty of classification, especially in the case of ventral hernia; there is an increased risk of inappropriateness while classifying patients [4]. The hernia conception has evolved numerously in recent years and entails the need for an intensive grading system that can propose a basis for a clear understanding of hernia staging while its progression.

Hernia is known as a progressive condition with disparities in symptoms and signs with anatomical differences. Such changes in this condition symptoms

produce mild, moderate to severe conditions in the case of hernia, the major contributors in the pathogenesis of the hernia are both intrinsic (gender, age, adiposity) and extrinsic factors (smoking, steroids, and undernutrition), which triggers the immune cells to release inflammatory mediators in the extracellular matrix to induce alterations in collagen metabolism rate and lead to loss of cellular integrity [5]. However, understanding the complete mechanism and biology of hernia is complex. The hernia appears with different anatomical presentations and changes, which confuses the clinician to decide on what kind of actions to be carried out to deal with the specific progression of the condition. In addition to such complexities, the grading system holds the potential to resolve the issue. However, understanding such grading/classification system based on progression is required. A hernia is initiated by the changes induced in the abdominal wall, which is shown as an abdominal wall defect in anatomical presentation without bulging or protrusion [6]. Wall defect can be followed by the incidence of reducible hernia, and it usually requires only physical examination to diagnose [7]. The reducible hernia is seen as asymptomatic, and the hernia can be pushed back into the abdominal region; hence the bulging outside the abdominal cavity is prevented [8]. Unlike reducible hernia, the irreducible hernia is more prominent and painful [9]. In this type of hernia, the content cannot be returned to the abdominal cavity as it is incarcerated outside of the abdominal site, and such a hernia may not be managed through physical examination. An irreducible hernia may not be prominent or can be strangulated in severe circumstances. Sometimes, the condition grows chronic without the onset of clear symptoms. However, it might appear as critical bowel symptoms and form strangulation that entails the need for emergency operation [10]. The confined bowel may induce ischemic symptoms to develop at the bowel site. Such alterations show differential classification of irreducible hernia where sub-categories emerge, presenting incarceration, obstruction, and strangulation (Reinke *et al.*, 2020). In more severe complications, hernia takes the form of gangrene with the blackish appearance of a bowel sac [11]. Even though gangrenous hernia comprised a small ratio of hernias found in the case of different types of hernia, such as compared to other progressive stages in ventral hernia, the gangrenous hernia is found only in a 0.4% ratio. However, gangrenes are associated with seeking emergency assistance [12]. All such types of separate features during progression show the way hernia progresses. An abdominal hernia is very prevalent in all age groups and is highly linked with increasing obesity found in today's world. It is most likely that symptoms do not appear even in medical examination sometimes and may lead to chronic severity; each phase of hernia progression requires clinical attention with different measurable steps. Therefore, grading of progressive hernia based on anatomical features is the ultimate need to classify the hernia condition and take either precautionary, preventable, or curable measures. Such types of measures are helpful to prevent the recurrence of hernia as well [13]. Based on the previous discussion, this paper will focus on the classification of ventral hernia and propose a comprehensive grading system for ventral hernias.

2. Research Aim

The general aim is to build up an easy and comprehensive grading/classification system to categorize Ventral hernia, which is based on literature probing the current issue and divided into different objectives.

3. Research Objectives

- 1) To determine different stages of ventral hernia progression.
- 2) To organize the work on ventral wall hernia research and make a common, understandable language between researchers.
- 3) To facilitate the communication between health care providers and document a ventral hernia stage and complication to be used for medico-legal uses.
- 4) To propose a grading system that will help to build up a future guideline in managing abdominal wall hernia.

4. Methods

This is a new grading system will be built upon the basics of physiology, anatomy, and pathology of hernia and will be a combined with the clinical picture and investigation to confirm hernia stage, The research design will involve the study of the hernia grading system through carrying out a literature review In this grading system to emphasize its importance.

We propose a grading system that will incorporate the progression of hernia, its anatomical content, and the complications associated. The study will define each grade comprehensively to allow a complete understanding of the basis of inclusion of such grading foundation [4].

Basis of Hanoon's Grading System:

Commonly known hernias have been classified through their clinical presentation of specific signs and symptoms indicating certain types [14]. Following this concept, we propose a grading system that we will call "Hanoon's" grading system, based upon the study of both clinical presentation and radiological evaluation of hernia anatomical features.

Studying Clinical Presentation:

The hernia has a common symptom, e.g., (pain, swelling vomiting, etc.), and signs, e.g. (coughing impulse), which is initially useful for the diagnosis, here in this grading system, we start with the patient by history taking "symptoms" that we need to gather for initiate a clinical picture about the cases, then will go for a physical examination focusing on hernia examination accompanied by general examination for the overall patient condition. Physical examination is carried out from different positions because the presentation can be different at the respective angle [15].

After history taking and physical examination for the patient, we will have a provisional diagnosis for hernia type and stage the then we will confirm that by the investigation.

Studying Radiological Evaluation:

Physical examination can be suitable for classifying the ventral hernia but not in all cases. Hence, a diagnostic evaluation is a substantial approach to categorizing the progression. It focuses on anatomical features and position differences. Even in the cases of recurrence, radiological diagnosis is suitable to detect persistence [16]. In the present research, we theoretically studied the radiological findings from the literature and evaluated the position and size changes presented on MRI [15]. In clinical practice and when applying this grading system, we can use different imaging modalities to evaluate patient condition e.g. (Ultrasound, Duplex, CT-scan, etc.). Choosing the imaging modality for investigating the patient and reaching the grade can be determined by physician, according to the patient situation e.g., (pregnant women can't be taken to do a CT scan), the physician can make the decision for which radiological investigation he will use. Finally based on both physical and radiological findings we can reach the grade or the class of hernia.

5. Results

By combining symptoms, signs, and radiological findings, we can classify the hernia into formed different grades. As shown in **Table 1**.

6. Discussion

In Hanoon's grading system, we divided ventral hernia according to the progression of its presentation and anatomical content, also we considered the complication that may occur with the hernia, and each grade has its own symptoms, signs, and radiological findings, by gathering all these information, we can classify hernia into grades.

Table 1. Hanoon's ventral hernia grading system.

Grade	Description
1	Established abdominal wall defect without any abdominal content protrusion
2A	Reducible omentum "only omentum protrusion without any intestine" NO evidence * 1 of complications * 1
2B	Reducible <u>intestinal protrusion</u> NO evidence of complications
3A	Irreducible "Incarcerated hernia." NO evidence of complications
3B	Irreducible "Obstructed Hernia" NO evidence of strangulation or gangrene
3C	Irreducible "Strangulated Hernia" NO evidence of gangrene
4	Gangrenous hernia

¹The evidence in this grading system depends on clinical diagnosis/radiological imaging as needed. ²Complications: "obstruction, strangulation or gangrene."

The first grad starts with the presence of abdominal wall defect as the first pathology in forming a hernia, and this defect has no protrusion of any abdominal content. In such cases, no protrusion can lead to a poor examination of ventral hernia [17] that may lead to some difficulties in identifying such a patient in this grad of hernia, without protrusion does not require surgical intervention [18].

The second group in the grading system is “reducible hernia.” In grade 2 a reducible hernia with different sac content, in this grad we do not have any hernia complications, complications can be identified either by clinical presentation/radiological and should be rolled out.

In this grade, we subdivided the hernia into 2 groups according to its content. Grade 2A contains “omentum”, Grade 2B contains intestine, and both grads have no obstruction, strangulation, or gangrene. Research has provided a model for understanding the reducible hernia complexity as well, which also documented the asymptomatic and symptomatic reducible hernia [19]. A significant proportion of patients present with reducible hernia. Patients in the case with asymptomatic reducible hernias are likely to develop symptoms and severity over time, and the situation tends to increase the chances of frequent clinical visits and the need for emergency repair [19]. Reducible hernia shows the presentation of omentum or small bowels that can be potentially pushed back to the abdominal region and is therefore excised easily. However, in reducible hernia cases, if not coordinated effectively in the clinical departments, the signs may further lead to harmful progression. It is very important to gather knowledge about how reducible hernia prevails and what are its clear indications to interfere. From the prospective analysis, it is determined that reducible hernia has been studied very rarely and we are looking for more studies on this side.

In grade 3, we have irreducible hernia which is widely explored in experimental and clinical research. The group has further sub-divisions, including grade 3A “irreducible, incarcerated hernia without obstruction or strangulation” 3B “irreducible obstructed hernia without any evidence of strangulation or gangrene,” and 3C “irreducible and strangulated hernia without gangrene.

Irreducibility is defined by the adherence of mesh at the abdominal site, whereas the obstruction is more prominent with features of pain [20]. It is systematically observed that large irreducible hernia is followed by “loss of domain” which is termed as the difference between hernia size and residual abdominal cavity. The greater the loss of domain ultimately means the large hernia, which is more complicated to be managed [21]. The patient may present the signs of irreducibility without showing obstruction or strangulation [22]. In addition, a strangulated hernia is caused when the ischemia is developed. The ischemia develops because of compromised blood supply to the affected region hence causing strangulation of that region [23]. More so, abdominal pain and vomiting are the secondary symptoms of strangulated ventral hernia [24].

The last grade is the fourth which is termed gangrenous hernia, and it may occur as early as 5 - 6 hours after the onset of ischemia or interrupted blood flow

to the site [25]. This stage can't be determined unless clear evidence is seen for gangrene, e.g. (black discoloration of the intestine). Arterial and venous occlusion is the major cause of the development of gangrene [26]. Gangrenes are formed if the strangulation is not managed and here, we see the progression of the hernia very clearly, which was the idea behind this grading system when the hernia progresses from stage to stage, finally, it will result in complete necrosis. The gangrene has a blackish appearance showing a dead area at the site of incidence [18].

Gangrene formation is one of the significant risk factors for inducing mortality in patients with a ventral hernia. The fact produced the concern for emergency operation in this case because no one should die from the condition [26] [27]. It means that reporting an accurate stage of progression can reduce the chances of mortality. Health care workers need to communicate with each other in an easy manner and we think this will be achieved by such a grading system.

The clinical focus is directed toward predicting operative complexity. Hence, for an understanding of complex condition such as hernias, Hanoon's grading system can facilitate clinical practices and help in decision making.

Finally, each grade of ventral hernia is characterized by different symptoms, signs, and radiological features, hernia is varying from simple abdominal wall defects to serious complications such as gangrenous, we tried here to simplify the hernia types arranging that in a grading system to be easily remembered and used.

We hope by this grading system to contribute to building future guidelines to manage ventral hernia aiming to the best outcome for the patients in a comprehensive scientific manner.

7. Conclusions

Our usual practices in hospitals describe a hernia with a long description based on site, size, content, and complication, which is time-consuming, and sometimes it is confusing. A grading or classification system for ventral hernia will be helpful for the documentation and communication between all healthcare providers as well as the researchers to be a common language.

By using Hanoon's grading system, the clinicians can get early recognition and manage the hernia. The researchers also may explore further knowledge by using the present research as a foundation for ventral hernia.

Conflicts of Interest

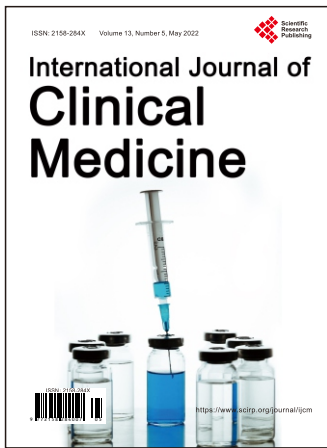
The author declares no conflicts of interest regarding the publication of this paper.

References

- [1] Öberg, S., Andresen, K. and Rosenberg, J. (2017) Etiology of Inguinal Hernias: A Comprehensive Review. *Frontiers in Surgery*, **4**, Article 52. <https://doi.org/10.3389/fsurg.2017.00052>

- [2] Appleby, P.W., Martin, T.A. and Hope, W.W. (2018) Umbilical Hernia Repair: Overview of Approaches and Review of Literature. *Surgical Clinics*, **98**, 561-576. <https://doi.org/10.1016/j.suc.2018.02.001>
- [3] Yang, M.J., Russell, K.W., Yoder, B.A. and Fenton, S.J. (2021) Congenital Diaphragmatic Hernia: A Narrative Review of Controversies in Neonatal Management. *Translational Pediatrics*, **10**, 1432-1447. <https://doi.org/10.21037/tp-20-142>
- [4] Kanters, A.E., Krpata, D.M., Blatnik, J.A., Novitsky, Y.M. and Rosen, M.J. (2012) Modified Hernia Grading Scale to Stratify Surgical Site Occurrence after Open Ventral Hernia Repairs. *Journal of the American College of Surgeons*, **215**, 787-793. <https://doi.org/10.1016/j.jamcollsurg.2012.08.012>
- [5] Franz, M.G. (2008) The Biology of Hernia Formation. *Surgical Clinics of North America*, **88**, 1-15. <https://doi.org/10.1016/j.suc.2007.10.007>
- [6] Mutwali, I.M. (2014) Incisional Hernia: Risk Factors, Incidence, Pathogenesis, Prevention, and Complications. *Sudan Medical Monitor*, **9**, 81. <https://doi.org/10.4103/1858-5000.146580>
- [7] Berger, D. (2016) Evidence-Based Hernia Treatment in Adults. *Deutsches Ärzteblatt International*, **113**, 150-158. <https://doi.org/10.3238/arztebl.2016.0150>
- [8] Jenkins, J.T. and O'Dwyer, P.J. (2008) Inguinal Hernias. *BMJ*, **336**, 269-272. <https://doi.org/10.1136/bmj.39450.428275.AD>
- [9] Hassaan, S., Sena, A.E.R.A. and Omar Al-alfy, M. (2020) Management of Irreducible Hernia Using Polypropylene Mesh. *Al-Azhar Medical Journal*, **49**, 1123-1134. <https://doi.org/10.21608/amj.2020.91633>
- [10] Reinke, C.E. and Matthews, B.D. (2020) What's New in the Management of Incarcerated Hernia. *Journal of Gastrointestinal Surgery*, **24**, 221-230. <https://doi.org/10.1007/s11605-019-04352-4>
- [11] Waheed, M., Alsenani, M., Al-Akeely, M. and Al-Qahtani, H. (2015) An Unusual Outcome of a Giant Ventral Hernia. *Saudi Medical Journal*, **36**, 983-986. <https://doi.org/10.15537/smj.2015.8.11559>
- [12] Azin, A., Hirpara, D., Jackson, T., Okrainec, A., Elnahas, A., Chadi, S.A. and Quereshy, F.A. (2019) Emergency Laparoscopic and Open Repair of Incarcerated Ventral Hernias: A Multi-Institutional Comparative Analysis with Coarsened Exact Matching. *Surgical Endoscopy*, **33**, 2812-2820. <https://doi.org/10.1007/s00464-018-6573-6>
- [13] AhmedAlenazi, A., Alsharif, M.M., Hussain, M.A., Alenezi, N.G., Alenazi, A.A., Almadani, S.A., *et al.* (2017) Prevalence, Risk Factors and Character of Abdominal Hernia in Arar City, Northern Saudi Arabia in 2017. *Electronic Physician*, **9**, 4806-4811. <https://doi.org/10.19082/4806>
- [14] Henriksen, N.A., Montgomery, A., Kaufmann, R., Berrevoet, F., East, B., Fischer, J., *et al.* (2020) Guidelines for Treatment of Umbilical and Epigastric Hernias from the European Hernia Society and Americas Hernia Society. *Journal of British Surgery*, **107**, 171-190. <https://doi.org/10.1002/bjs.11489>
- [15] Smith, J. and Parmely, J.D. (2020) Ventral Hernia. StatPearls.
- [16] Holihan, J.L., Karanjawala, B., Ko, A., Askenasy, E.P., Matta, E. J., Gharbaoui, L., *et al.* (2016) Use of Computed Tomography in Diagnosing Ventral Hernia Recurrence: A Blinded, Prospective, Multispecialty Evaluation. *JAMA Surgery*, **151**, 7-13. <https://doi.org/10.1001/jamasurg.2015.2580>
- [17] Ray-Offor, E. and Okeke, C.J. (2021) Elective Repair of Adult Abdominal Wall Hernia: A Nigerian Tertiary Hospital Experience. *European Journal of Medical and*

- Health Sciences*, **3**, 68-72. <https://doi.org/10.24018/ejmed.2021.3.1.668>
- [18] Rao, A.M.K. (2019) Ventral Hernia: Causes and Management. In: Guttadauro, A., Ed., *Techniques and Innovation in Hernia Surgery*, IntechOpen, London.
- [19] Wolf, L.L., Ejiófor, J.I., Wang, Y., Hunink, M.G., Losina, E., Haider, A.H. and Smink, D.S. (2019) Management of Reducible Ventral Hernias: Clinical Outcomes and Cost-Effectiveness of Repair at Diagnosis versus Watchful Waiting. *Annals of Surgery*, **269**, 358-366. <https://doi.org/10.1097/SLA.0000000000002507>
- [20] Bagwan, L., Patwa, P. and Kumar, K. (2020) Laparoscopic Ventral Hernia Repair: Comparison of Tacker v/s Monofilament Suture. *International Journal of Surgery Trauma and Orthopedics*, **6**, 215-219. <https://doi.org/10.17511/ijoso.2020.i03.13>
- [21] Parker, S.G., Halligan, S., Blackburn, S., Plumb, A.A.O., Archer, L., Mallett, S. and Windsor, A.C.J. (2019) What Exactly Is Meant by “Loss of Domain” for Ventral Hernia? Systematic Review of Definitions. *World Journal of Surgery*, **43**, 396-404. <https://doi.org/10.1007/s00268-018-4783-7>
- [22] Chavan, S.S., Baruah, T.D. and Ganesh Babu, C.P. (2017) A Clinical Study on Ventral Hernias in a Tertiary Care Hospital. *International Surgery Journal*, **4**, 2600-2604. <https://doi.org/10.18203/2349-2902.isj20173106>
- [23] Pastorino, A. and Alshuqayfi, A.A. (2021) Strangulated Hernia. StatPearls.
- [24] Germanò, P., Siboni, S., Milito, P., Mautone, G., Resta, M. and Bonavina, L. (2021) Ventral Hernia Repair under Neuraxial Anesthesia. *European Surgery*, **54**, 54-58. <https://doi.org/10.1007/s10353-021-00731-x>
- [25] Lin, M.P., Chen, Y.L. and Shu, G.H. (2018) Diagnosis of a Gangrenous, Strangulated & Incarcerated Inguinal Hernia by Identifying C-Shaped Small Bowel Loops and the Serrated Beak Appearance. *Scholarena Journal of Case Reports*, **5**, 1-3. <https://doi.org/10.18875/2375-7043.5.407>
- [26] Latifi, R. (2020) Ventral Hernia Should Be Treated Surgically, and No One Should Die from It. *Surgical Technology International*, **39**, 204-205. <https://doi.org/10.52198/21.STI.39.HR1513>
- [27] Smiley, A., Levy, L. and Latifi, R. (2021) Risk Factors for Mortality in Patients with Ventral Hernia Admitted Emergently: An Analysis of 48,539 Adult Patients. *Surgical Technology International*, **39**, 183-190. <https://doi.org/10.52198/21.STI.39.HR1497>



International Journal of Clinical Medicine

ISSN: 2158-284X (Print) ISSN: 2158-2882 (Online)

<https://www.scirp.org/journal/ijcm>

International Journal of Clinical Medicine (IJCM) is a peer reviewed journal dedicated to the latest advancement of clinical medicine. The goal of this journal is to keep a record of the state-of-the-art research and to promote study, research and improvement within its various specialties.

Subject Coverage

The journal publishes original papers including but not limited to the following fields:

- Allergy and Clinical Immunology
- Cancer Research and Clinical Oncology
- Clinical Anaesthesiology
- Clinical Anatomy
- Clinical and Applied Thrombosis/Hemostasis
- Clinical and Experimental Allergy
- Clinical and Experimental Dermatology
- Clinical and Experimental Hypertension
- Clinical and Experimental Immunology
- Clinical and Experimental Medicine
- Clinical and Experimental Metastasis
- Clinical and Experimental Nephrology
- Clinical and Experimental Ophthalmology
- Clinical and Experimental Optometry
- Clinical and Experimental Otorhinolaryngology
- Clinical and Experimental Pathology
- Clinical and Experimental Pharmacology and Physiology
- Clinical and Molecular Allergy
- Clinical and Translational Oncology
- Clinical Anesthesia
- Clinical Apheresis
- Clinical Autonomic Research
- Clinical Biochemistry and Nutrition
- Clinical Biomechanics
- Clinical Cardiology
- Clinical Case Studies
- Clinical Child Psychology and Psychiatry
- Clinical Chiropractic
- Clinical Densitometry
- Clinical Effectiveness in Nursing
- Clinical Endocrinology and Metabolism
- Clinical Epidemiology
- Clinical Forensic Medicine
- Clinical Gastroenterology and Hepatology
- Clinical Genetics
- Clinical Haematology
- Clinical Hypertension
- Clinical Imaging
- Clinical Immunology
- Clinical Implant Dentistry and Related Research
- Clinical Interventions in Aging
- Clinical Laboratory Analysis
- Clinical Linguistics & Phonetics
- Clinical Lipidology
- Clinical Microbiology and Antimicrobials
- Clinical Microbiology and Infection
- Clinical Microbiology and Infectious Diseases
- Clinical Molecular Pathology
- Clinical Monitoring and Computing
- Clinical Neurology and Neurosurgery
- Clinical Neurophysiology
- Clinical Neuropsychology
- Clinical Neuroradiology
- Clinical Neuroscience
- Clinical Nursing
- Clinical Nutrition
- Clinical Obstetrics and Gynaecology
- Clinical Oncology and Cancer Research
- Clinical Ophthalmology
- Clinical Oral Implants Research
- Clinical Oral Investigations
- Clinical Orthopaedics and Related Research
- Clinical Otolaryngology
- Clinical Pathology
- Clinical Pediatric Emergency Medicine
- Clinical Periodontology
- Clinical Pharmacology & Toxicology
- Clinical Pharmacy and Therapeutics
- Clinical Physiology and Functional Imaging
- Clinical Practice and Epidemiology in Mental Health
- Clinical Psychology and Psychotherapy
- Clinical Psychology in Medical Settings
- Clinical Radiology
- Clinical Rehabilitation
- Clinical Research and Regulatory Affairs
- Clinical Research in Cardiology
- Clinical Respiratory
- Clinical Rheumatology
- Clinical Simulation in Nursing
- Clinical Sleep Medicine
- Clinical Techniques in Small Animal Practice
- Clinical Therapeutics
- Clinical Toxicology
- Clinical Transplantation
- Clinical Trials
- Clinical Ultrasound
- Clinical Virology
- Complementary Therapies in Clinical Practice
- Consulting and Clinical Psychology
- Contemporary Clinical Trials
- Controlled Clinical Trials
- Diabetes Research and Clinical Practice
- Evaluation in Clinical Practice
- Fundamental & Clinical Pharmacology
- Hereditary Cancer in Clinical Practice
- Human Psychopharmacology: Clinical and Experimental
- Innovations in Clinical Neuroscience
- Laboratory and Clinical Medicine
- Neurophysiologie Clinique/Clinical Neurophysiology
- Nutrition in Clinical Practice
- Pacing and Clinical Electrophysiology
- Psychiatry in Clinical Practice
- Therapeutics and Clinical Risk Management
- Veterinary Clinical Pathology

We are also interested in short papers (letters) that clearly address a specific problem, and short survey or position papers that sketch the results or problems on a specific topic. Authors of selected short papers would be invited to write a regular paper on the same topic for future issues of the *IJCM*.

Notes for Intending Authors

All manuscripts submitted to *IJCM* must be previously unpublished and may not be considered for publication elsewhere at any time during *IJCM*'s review period. Paper submission will be handled electronically through the website. All papers are refereed through a peer review process. Additionally, accepted ones will immediately appear online followed by printed in hard copy. For more details about the submissions, please access the website.

Website and E-Mail

<https://www.scirp.org/journal/ijcm>

Email: ijcm@scirp.org

What is SCIRP?

Scientific Research Publishing (SCIRP) is one of the largest Open Access journal publishers. It is currently publishing more than 200 open access, online, peer-reviewed journals covering a wide range of academic disciplines. SCIRP serves the worldwide academic communities and contributes to the progress and application of science with its publication.

What is Open Access?

All original research papers published by SCIRP are made freely and permanently accessible online immediately upon publication. To be able to provide open access journals, SCIRP defrays operation costs from authors and subscription charges only for its printed version. Open access publishing allows an immediate, worldwide, barrier-free, open access to the full text of research papers, which is in the best interests of the scientific community.

- High visibility for maximum global exposure with open access publishing model
- Rigorous peer review of research papers
- Prompt faster publication with less cost
- Guaranteed targeted, multidisciplinary audience



**Scientific
Research
Publishing**

**Website: <https://www.scirp.org>
Subscription: sub@scirp.org
Advertisement: service@scirp.org**