



The diagnostic values of procalcitonin and interleukin 6 in acute appendicitis

Alireza Rastgoo Haghi¹ , Amir Kasraianfard² , Alireza Monsel¹ , Amin Shoa Kazemi³ , Siavash Rahimi³ ,
Seyed Mohammad Reza Javadi¹ 

ABSTRACT

Objective: Despite the recent use of computed tomography scan and diagnostic laparoscopy, acute appendicitis is still highly misdiagnosed. Timely diagnosis of acute appendicitis is more crucial in children and elderly patients because of vague symptoms and rapid progression to perforation in these age groups, which may result in high rates of morbidity and mortality. The aim of the present study was to find the diagnostic values of procalcitonin and interleukin 6 (IL-6) for diagnosing acute appendicitis in our center.

Material and methods: Patients who were suspected of acute appendicitis and who were referred to the emergency department of a tertiary care urban hospital in 2016 were enrolled in the study. A 5 ml blood sample was obtained from each patient before appendectomy and was examined for procalcitonin and IL-6. Then, the resected specimen of the appendix was studied by a pathologist, and a definite diagnosis was made.

Results: Eighty patients including 53 (66.3%) men who underwent appendectomy were enrolled in the study. The diagnosis of acute appendicitis was histopathologically confirmed in 60 (75%) patients including 18, 20, and 22 patients with inflammatory, suppurative, and gangrenous/perforated appendicitis, respectively. The sensitivity and specificity of procalcitonin versus IL-6 for diagnosing acute appendicitis were 65% and 80% vs. 76% and 55%, respectively. The sensitivity and specificity of concurrent procalcitonin and IL-6 for diagnosing acute appendicitis were 91% and 55%, respectively.

Conclusion: Our study suggests that parallel measurement of procalcitonin and IL-6 decreases unnecessary negative appendectomies.

Keywords: Appendicitis, interleukin 6, procalcitonin

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INTRODUCTION

Appendicitis is the most common cause of surgery of the abdomen with an incidence rate of 11 in 10,000 annually and most commonly occurred in the second to fourth decade of life especially in young adults (1, 2). Timely diagnosis of acute appendicitis is crucial especially in children and elderly patients because of vague symptoms and rapid progression to perforation in these age groups, which may result in high rates of complications including wound infection, intra-abdominal abscess formation, and mortality (3, 4). Despite the recent use of computed tomography scan and diagnostic laparoscopy, acute appendicitis is still highly misdiagnosed at a rate of 1-5%, with the highest number of negative appendectomy seen in elderly women (5). Hence, additional preoperative testing may be helpful for the timely diagnosis of acute appendicitis. Although the role of the measurement of inflammatory cytokines, such as procalcitonin, interleukin 6 (IL-6), and C-reactive protein, which are involved in acute and chronic inflammatory responses in addition to the measurement of white cell count and bilirubin for diagnosing acute appendicitis, has been investigated in few studies, the results varied with no consensus about the best test (6, 7).

The aim of the present study was to find the diagnostic values of procalcitonin and IL-6 in the diagnosis of acute appendicitis and their associations with the severity of the disease in our center.

MATERIAL AND METHODS

Patient selection

In this prospective study, patients who were suspected of acute appendicitis and who were referred to the emergency department of a tertiary care urban hospital in 2016 were enrolled in the study. Patients with an Alvarado score of ≥ 5 or in whom the diagnosis of acute appendicitis was documented using computed tomography scan were included in the study. Exclusion criteria comprised patients with a history of autoimmune disease; who underwent transplantation; receiving immunosuppressive, antibiotic, and/or immunomodulator drugs; who were in sepsis; or who were markedly overweight with a body mass index ≥ 25 . All patients were visited and examined by the same surgeon.

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Evidenzbasierte Medizin in Anästhesie und Intensivmedizin R. Kuhlen, R. Rossaint, 2007-01-10 Welche Studienergebnisse entsprechen der besten wissenschaftlichen Evidenz Erfahrene Herausgeber und Autoren stellen hier aktuelle Studienergebnisse nach EBM Kriterien zusammen Bereits nach kurzer Zeit in 2 komplett aktualisierter Auflage systematisch gegliedert nach den Bereichen Anästhesie und Intensivmedizin Um viele praxisrelevante Themen erweitert u a der kardiale Risikopatient Transfusions und Gerinnungsmanagement Analgosedierung und Blutzuckermanagement auf der Intensivstation Ein Werk das rztliche Entscheidungen auf eine wissenschaftliche Basis stellt und aktuelle Studienergebnisse in den Klinikalltag integriert **Inflammation, 4 Volume Set** Jean-Marc Cavaillon, Mervyn Singer, 2018-02-20 Dieses Fachbuch erl utert die molekularen Grundlagen von Entz ndungen spannt den Bogen zu Infektionskrankheiten und den Zusammenhang zwischen Entz ndungen und chronischen Erkrankungen behandelt abschlie end den Heilungsprozess und zeigt Therapiem glichkeiten **Advances in Clinical Chemistry** , 2012-12-31 Volume 59 in the internationally acclaimed Advances in Clinical Chemistry contains chapters submitted from leading experts from academia and clinical laboratory science Authors are from a diverse field of clinical chemistry disciplines and diagnostics ranging from basic biochemical exploration to cutting edge microarray technology Written by authors representing the diverse field of clinical chemistry and diagnostics reviews in Advances in Clinical Chemistry cover a range of cutting eduge research ranging from basic biochemical exploration to microarray technology Biomarkers in the Critically Ill Patient, An Issue of Critical Care Clinics Mitchell M. Levy, 2011-04-28 Guest edited by Dr Michell Levy articles for this edition of Critical Care Clinics include Specificity and sensitivity How to use biomarkers Physiologic Parameters as biomarkers What can we learn from physiologic variables and variation Multi marker Panels Coagulation biomarkers Biomarkers in neurosurgery Biomarkers in Trauma and Cardiac Biomarkers *Diagnostik und Intensivtherapie bei Sepsis und Multiorganversagen* L. Engelmann, H.-P. Schuster, 2007-12-22 Zw lf Jahre nach der Festschreibung der diagnostischen Kriterien der Sepsis werden die SIRS Kriterien noch immer ignoriert vor allem im Vorfeld der Intensivmedizin aber auch auf den Intensivstationen Nur gut die H lfte der deutschen Intensivmediziner stellt die Diagnose der Sepsis nach einheitlichen Kriterien hnlich liegen die Dinge bei der Umsetzung therapeutischer Grunds tze und Empfehlungen Dieser multidisziplin r angelegte Band mit Artikeln aus der Zeitschrift Intensivmedizin und Notfallmedizin erg nzt in idealer Weise die im Jahr 2005 publizierte S2 Leitlinie Diagnose und Therapie der Sepsis und bildet den aktuellen Stand des Wissens auf diesem Gebiet ab Damit ist erstmals eine geschlossene Darstellung zur Sepsis verf gbar der zurzeit gr ten Herausforderung an die Intensivmedizin **Principles and Practice of Critical Care** P. K. Verma, 2019-09-08 This edition is presented in a totally new and reader friendly format The focus of this volume is on holistic management of critically ill adult patients and it builds upon concepts one step at a time allowing one the opportunity to develop competence at one s own pace **Clinical Approaches to Hospital Medicine** Kevin

Conrad,2017-11-09 This book provides an update on recent clinical practice and an in depth view of selected topics relevant to hospital medicine It is divided into four sections that explore clinical administrative systems and ethical issues Each section places an emphasis on the opportunities challenges and potential directions of this burgeoning subspecialty An important topic covered extensively is how hospitalists are being called to lead on the current opioid epidemic given that they are well suited in responding to complicated challenges crossing all specialties Other chapters explore worldwide practice patterns and practical application of philosophical tools in daily practice This up to date resource provides hospitalists advanced nurse practitioners medical students and administrators with the latest research trends and issues in hospital medicine

New Trends in Biomarkers and Diseases: An Overview Juan Antonio Vélchez,María Dolores Albaladejo-Otón,2017-09-29 Biomarkers are any measurable biochemical characteristics of an organism that reflect a particular physiological state Biomarkers can take many different forms including particular proteins or peptides antibodies cell types metabolites hormones enzyme levels compounds related to genomics etc A biomarker can also be a substance introduced into a patient to assess the internal organ systems role In medicine biomarkers considered as compounds isolated from serum urine or other fluids can be used as an indicator of the presence or severity of a particular disease state The use of biomarkers is becoming a fundamental practice in medicine Biomarker research involves a significantly greater scope of laboratory medicine This monograph presents information on several types of biomarkers for general pathologies preeclampsia metabolic syndrome iron metabolism bone disease liver function renal function cardiovascular pathology including atrial fibrillation peripheral artery disease thrombotic disorders and sepsis Additional information on endocrine and salivary biomarkers is also presented New Trends in Biomarkers and Diseases An Overview is an ideal reference for medical students pathology trainees and clinical researchers seeking information on biomarkers in medicine

Ensuring Innovation in Diagnostics for Bacterial Infection Morel C.,McClure L.,Edwards S.,Goodfellow V.,Sandberg D.,Thomas J.,2016-04-18 The inappropriate use of antibiotics is a primary cause of the ongoing increase in drug resistance amongst pathogenic bacteria The resulting decrease in the efficacy of antibiotics threatens our ability to combat infectious diseases Rapid point of care tests to identify pathogens and better target the appropriate treatment could greatly improve the use of antibiotics Yet there are few such tests currently available or being developed despite the rapid pace of medical innovation Clearly something is inhibiting the much needed development of new and more convenient diagnostic tools This study delineates priorities for developing diagnostics to improve antibiotic prescription and use with the goal of managing and curbing the expansion of drug resistance It calls for new approaches particularly in the provision of diagnostic devices and in doing so outlines some of the inadequacies in health science and policy initiatives that have led to the dearth of such devices The authors make the case that there is a clear and urgent need for innovation not only in the technology of diagnosis but also in public policy and medical practice to support the availability and use of better diagnostic tools This book explores the

complexities of the diagnostics market from the perspective of both supply and demand unearthing interesting bottlenecks some obvious some more subtle It calls for a multifaceted and broad policy response and an overhaul of current practice so that the growth of bacterial resistance can be stemmed

Inflammation Jean-Marc Cavaillon,Mervyn Singer,2017-10-02 The leading reference on this topic of increasing medical relevance is unique in offering unparalleled coverage The editors are among the most respected researchers in inflammation worldwide and here have put together a prestigious team of contributors Starting with the molecular basis of inflammation from cytokines via the innate immune system to the different kinds of inflammatory cells they continue with the function of inflammation in infectious disease before devoting a large section to the relationship between inflammation and chronic diseases The book concludes with wound and tissue healing and options for therapeutic interventions A must have for clinicians and biomedical researchers alike

FAP Allgemein- und Viszeralchirurgie Kuno Lehmann,Hans Lippert,Marc André Reymond,2022-09-20 Der Pr fungsstoff lernt sich leichter wenn alle relevanten Bereiche anschaulich abgehandelt werden Das Buch bringt Sie in eine virtuelle Pr fungssituation Es f hrt Sie mit Fallbeispielen Fragen und Antworten durch den kompletten Pr fungsstoff der Allgemein und Viszeralchirurgie praxisnah und anschaulich durch bebilderte Fallbeispiele interaktiv durch Fragen und Antworten zu Diagnostik und Therapie praktisch durch klaren Bezug zur Weiterbildungsordnung in Deutschland sterreich und Schweiz aktuell durch evidenzbasierte Therapieempfehlungen und Leitlinien kompetent durch pr fungserfahrene Autor innen Die 3 Auflage wurde komplett bearbeitet und orientiert sich an den Weiterbildungsordnungen in Deutschland sterreich und Schweiz So sind Sie bestens ger stet f r die Facharztpr fung Das Buch eignet sich f r Weiterbildungsassistent innen Allgemein und Visszeralchirurgie

Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases E-Book John E. Bennett,Raphael Dolin,Martin J. Blaser,Gerald L. Mandell,2009-10-19 After thirty years PPID is still the reference of choice for comprehensive global guidance on diagnosing and treating the most challenging infectious diseases Drs Mandell Bennett and Dolin have substantially revised and meticulously updated this new edition to save you time and to ensure you have the latest clinical and scientific knowledge at your fingertips With new chapters expanded and updated coverage increased worldwide perspectives and many new contributors Mandell Douglas and Bennett s Principles and Practice of Infectious Diseases 7th Edition helps you identify and treat whatever infectious disease you see Consult this title on your favorite e reader conduct rapid searches and adjust font sizes for optimal readability Compatible with Kindle nook and other popular devices Get the answers to questions you have with more in depth coverage of epidemiology etiology pathology microbiology immunology and treatment of infectious agents than you ll find in any other infectious disease resource Find the latest diagnoses and treatments for currently recognized and newly emerging infectious diseases such as those caused by avian and swine influenza viruses Put the latest knowledge to work in your practice with new or completely revised chapters on influenza new pandemic strains new Middle East respiratory syndrome MERS virus probiotics antibiotics for resistant

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Greenwald,Grace S Huang,2012-07-28 This new online Clinics series Hospital Medicine Clinics provides evidence based answers to clinical questions the practicing hospitalist faces daily This third issue in our growing online database covers essential updates in the following topics B type natriuretic peptide procalcitonin erythrocyte sedimentation rate and C reactive protein urine lytes rational testing in patients with gastrointestinal bleeding antinuclear antibody testing serum protein electrophoresis urine protein electrophoresis and immunoelectrophoresis patient controlled analgesia total parenteral nutrition and peripheral parenteral nutrition and rational lab testing **Index Medicus** ,2001 **Advanced**

Trauma and Surgery Xiaobing Fu,Liangming Liu,2016-11-15 This book discusses different aspects of trauma surgery ranging from the various types of trauma and their management infection sepsis and inflammation to tissue injury and repair in trauma It discusses cellular molecular and genetic research findings and their role in pathogenesis in trauma and injury In addition it highlights the translational application of advanced theories and technologies in the management of trauma patients This book is a valuable resource for anyone involved in the management of severe trauma damage to tissues wanting to reduce early mortality and improve patients quality of life **Acute pancreatitis infection: Epidemiology, prevention, clinical characteristics, treatment, and prediction** Wandong Hong,Jingye Pan,Maddalena Zippi,Hemant

Goyal,2023-04-14 **Practical Pulmonary and Critical Care Medicine** Zab Mosenifar,Guy W. Soo Hoo,2006-01-20

Including previously unpublished guidelines and recent care descriptions not available in any other text this reference provides illustrative chapters on the identification diagnosis and management of commonly encountered diseases and conditions in the care of the critically ill patient Researching the most recent clinical trials and supplying Interleukins: Advances in Research and Application: 2011 Edition ,2012-01-09 Interleukins Advances in Research and Application 2011

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