

# World Journal of *Hepatology*

*World J Hepatol* 2017 May 8; 9(13): 613-644





**Contents**

Three issues per month Volume 9 Number 13 May 8, 2017

**REVIEW**

- 613 Hepatic complications induced by immunosuppressants and biologics in inflammatory bowel disease  
*Tran-Minh ML, Sousa P, Maillet M, Allez M, Gornet JM*

**MINIREVIEWS**

- 627 Management of centrally located hepatocellular carcinoma: Update 2016  
*Yu WB, Rao A, Vu V, Xu L, Rao JY, Wu JX*

**ORIGINAL ARTICLE**

**Retrospective Study**

- 635 Importance of surgical margin in the outcomes of hepatocellular carcinoma  
*Ma KW, Chok KSH*

**LETTERS TO THE EDITOR**

- 642 Bi-directional hepatic hydrothorax  
*Nellaiyappan M, Kapetanios A*

**ABOUT COVER**

Editorial Board Member of *World Journal of Hepatology*, Wei-Bo Yu, MD, PhD, Department of Pathology and Laboratory Medicine, University of California, Los Angeles (UCLA), Los Angeles, CA 90095, United States

**AIM AND SCOPE**

*World Journal of Hepatology* (*World J Hepatol*, *WJH*, online ISSN 1948-5182, DOI: 10.4254), is a peer-reviewed open access academic journal that aims to guide clinical practice and improve diagnostic and therapeutic skills of clinicians.

*WJH* covers topics concerning liver biology/pathology, cirrhosis and its complications, liver fibrosis, liver failure, portal hypertension, hepatitis B and C and inflammatory disorders, steatohepatitis and metabolic liver disease, hepatocellular carcinoma, biliary tract disease, autoimmune disease, cholestatic and biliary disease, transplantation, genetics, epidemiology, microbiology, molecular and cell biology, nutrition, geriatric and pediatric hepatology, diagnosis and screening, endoscopy, imaging, and advanced technology. Priority publication will be given to articles concerning diagnosis and treatment of hepatology diseases. The following aspects are covered: Clinical diagnosis, laboratory diagnosis, differential diagnosis, imaging tests, pathological diagnosis, molecular biological diagnosis, immunological diagnosis, genetic diagnosis, functional diagnostics, and physical diagnosis; and comprehensive therapy, drug therapy, surgical therapy, interventional treatment, minimally invasive therapy, and robot-assisted therapy.

We encourage authors to submit their manuscripts to *WJH*. We will give priority to manuscripts that are supported by major national and international foundations and those that are of great basic and clinical significance.

**INDEXING/ABSTRACTING**

*World Journal of Hepatology* is now indexed in Emerging Sources Citation Index (Web of Science), PubMed, PubMed Central, and Scopus.

**FLYLEAF**

**I-IV** Editorial Board

**EDITORS FOR THIS ISSUE**

**Responsible Assistant Editor:** *Xiang Li*  
**Responsible Electronic Editor:** *Dan Li*  
**Proofing Editor-in-Chief:** *Lian-Sheng Ma*

**Responsible Science Editor:** *Fung-Fung Ji*  
**Proofing Editorial Office Director:** *Xiu-Xia Song*

**NAME OF JOURNAL**  
*World Journal of Hepatology*

**ISSN**  
 ISSN 1948-5182 (online)

**LAUNCH DATE**  
 October 31, 2009

**FREQUENCY**  
 36 Issues/Year (8<sup>th</sup>, 18<sup>th</sup>, and 28<sup>th</sup> of each month)

**EDITORS-IN-CHIEF**  
**Clara Balsano, PhD, Professor**, Department of Biomedicine, Institute of Molecular Biology and Pathology, Rome 00161, Italy

**Wan-Long Chuang, MD, PhD, Doctor, Professor**, Hepatobiliary Division, Department of Internal Medicine, Kaohsiung Medical University Hospital, Kaohsiung Medical University, Kaohsiung 807, Taiwan

**EDITORIAL BOARD MEMBERS**  
 All editorial board members resources online at <http://www.wjgnet.com>

[www.wjgnet.com/1948-5182/editorialboard.htm](http://www.wjgnet.com/1948-5182/editorialboard.htm)

**EDITORIAL OFFICE**  
 Xiu-Xia Song, Director  
*World Journal of Hepatology*  
 Baishideng Publishing Group Inc  
 7901 Stoneridge Drive,  
 Suite 501, Pleasanton, CA 94588, USA  
 Telephone: +1-925-2238242  
 Fax: +1-925-2238243  
 E-mail: [editorialoffice@wjgnet.com](mailto:editorialoffice@wjgnet.com)  
 Help Desk: <http://www.f6publishing.com/helpdesk>  
<http://www.wjgnet.com>

**PUBLISHER**  
 Baishideng Publishing Group Inc  
 7901 Stoneridge Drive,  
 Suite 501, Pleasanton, CA 94588, USA  
 Telephone: +1-925-2238242  
 Fax: +1-925-2238243  
 E-mail: [bpgoffice@wjgnet.com](mailto:bpgoffice@wjgnet.com)  
 Help Desk: <http://www.f6publishing.com/helpdesk>  
<http://www.wjgnet.com>

**PUBLICATION DATE**  
 May 8, 2017

**COPYRIGHT**  
 © 2017 Baishideng Publishing Group Inc. Articles published by this Open Access journal are distributed under the terms of the Creative Commons Attribution Non-commercial License, which permits use, distribution, and reproduction in any medium, provided the original work is properly cited, the use is non commercial and is otherwise in compliance with the license.

**SPECIAL STATEMENT**  
 All articles published in journals owned by the Baishideng Publishing Group (BPG) represent the views and opinions of their authors, and not the views, opinions or policies of the BPG, except where otherwise explicitly indicated.

**INSTRUCTIONS TO AUTHORS**  
<http://www.wjgnet.com/bpg/gerinfo/204>

**ONLINE SUBMISSION**  
<http://www.f6publishing.com>

## Bi-directional hepatic hydrothorax

Madhan Nellaiyappan, Anastasios Kapetanos

Madhan Nellaiyappan, Anastasios Kapetanos, Department of Medicine, Allegheny Health Network, Pittsburgh, PA 15212, United States

**Author contributions:** Nellaiyappan M gathered data and drafted the article; Kapetanos A critically reviewed and revised the article.

**Conflict-of-interest statement:** None.

**Open-Access:** This article is an open-access article which was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

**Manuscript source:** Unsolicited manuscript

**Correspondence to:** Madhan Nellaiyappan, Resident, Department of Medicine, Allegheny Health Network, 7<sup>th</sup> Floor South Tower, 320 East North Ave, Pittsburgh, PA 15212, United States. [drnmadhan@gmail.com](mailto:drnmadhan@gmail.com)  
Telephone: +1-412-3302400

Received: November 9, 2016

Peer-review started: November 10, 2016

First decision: December 20, 2016

Revised: March 27, 2017

Accepted: April 18, 2017

Article in press: April 20, 2017

Published online: May 8, 2017

### Abstract

A 59-year-old male with alcoholic cirrhosis presented to our hospital with an acutely painful umbilical hernia, and 4 mo of exertional dyspnea. He was noted to be tachypneic and hypoxic. He had a massive right sided pleural effusion with leftward mediastinal shift and gross ascites, with a tense, fluid-filled, umbilical hernia.

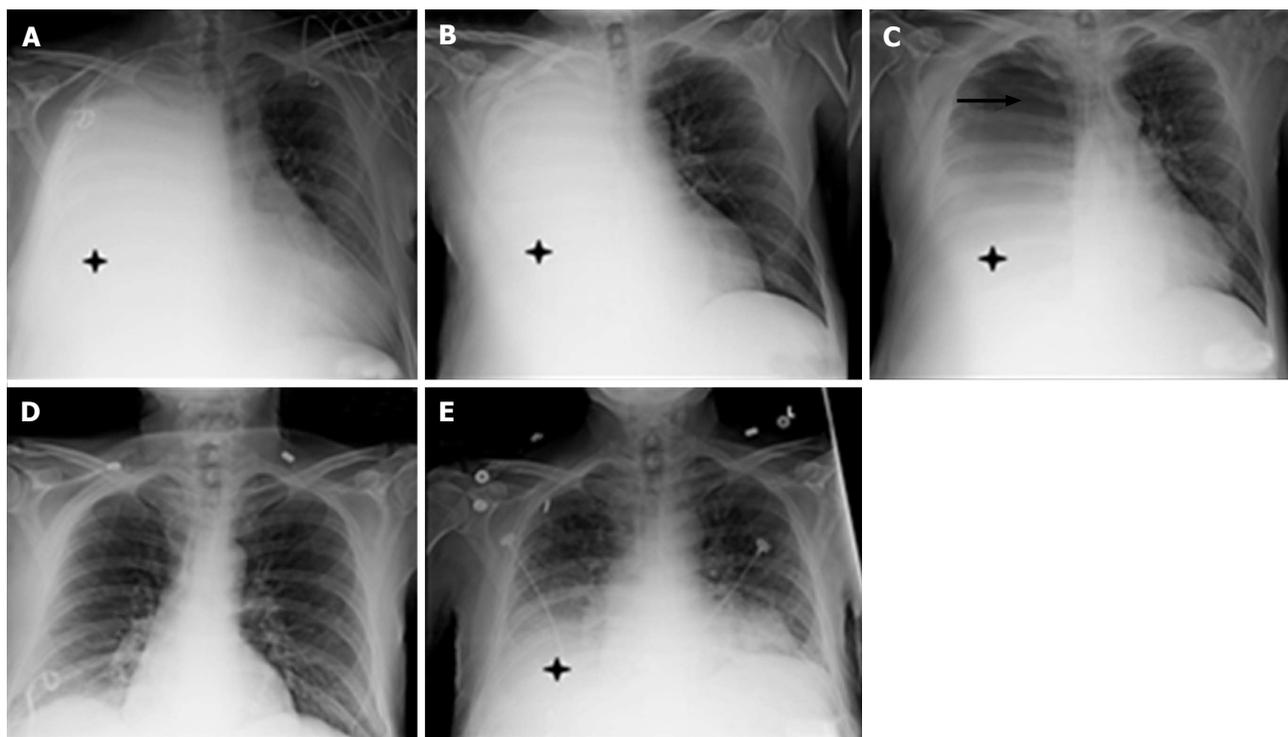
Emergent paracentesis with drain placement and a large volume thoracentesis were performed. Despite improvement in dyspnea and drainage of 15 L of ascitic fluid, the massive transudative pleural effusion remained largely unchanged. He underwent a repeat large volume thoracentesis on hospital day 4. The patient subsequently developed a tension pneumothorax, which resulted in a dramatic reduction in the effusion. A chest tube was placed and serial radiographs demonstrated resolution of the pneumothorax but recurrence of the effusion. The radiographs illustrate the movement of fluid between the peritoneal and pleural cavities. In this case, the mechanism of pleural effusion was confirmed to be a hepatic hydrothorax *via* an unintended tension pneumothorax. Methods to elucidate a hepatic hydrothorax include Tc99m or indocyanine green injection into the ascitic fluid followed by its demonstration above the diaphragm. The unintended tension pneumothorax in this case additionally demonstrates bi-directional flow across the diaphragm.

**Key words:** Hepatic hydrothorax; Bidirectional flow; Iatrogenic pneumothorax

© **The Author(s) 2017.** Published by Baishideng Publishing Group Inc. All rights reserved.

**Core tip:** Hepatic hydrothorax is usually a clinical diagnosis in patients with cirrhosis and portal hypertension who present with a transudative pleural effusion. The authors herein report an interesting case of radiological confirmation of hepatic hydrothorax through a series of chest radiographs that depict the movement of ascitic fluid between the pleural and peritoneal cavities due to a iatrogenic pneumothorax.

Nellaiyappan M, Kapetanos A. Bi-directional hepatic hydrothorax. *World J Hepatol* 2017; 9(13): 642-644 Available from: URL: <http://www.wjgnet.com/1948-5182/full/v9/i13/642.htm> DOI: <http://dx.doi.org/10.4254/wjh.v9.i13.642>



**Figure 1** Serial chest radiographs. A: Day 0; B: Day 3; C: Day 4; D: Day 7; E: Day 26. A-C, E: Effusion (asterisks); C: Pneumothorax (arrow).

## TO THE EDITOR

We read with great interest the article titled "A fascinating presentation of hepatic hydrothorax" by Gaduputi *et al*<sup>[1]</sup>. We would like to thank the authors for sharing the clinical images and case details which illustrate the rapid shifts in the hydrothorax in a patient who was on invasive positive pressure ventilatory support. We would like to report an interesting case of hepatic hydrothorax that we encountered in our clinical practice which also demonstrates the mechanics of hepatic hydrothorax. We believe that the images of this common, yet incompletely understood phenomenon will be of interest to your readers at large.

The patient was a 59-year-old male with Child C cirrhosis in the setting of alcohol abuse and chronic hepatitis C who presented to our hospital with an acutely painful umbilical hernia, and 4 mo of exertional dyspnea. He was noted to be tachypneic and hypoxic. He had a massive right sided pleural effusion with leftward mediastinal shift (Figure 1A, day 0, asterisk) and gross ascites with a tense, fluid-filled, umbilical hernia. Emergent paracentesis with drain placement and a large volume thoracentesis were performed. Despite improvement in dyspnea and 15 L of ascitic fluid drainage, the massive transudative effusion remained largely unchanged (Figure 1B, day 3, asterisk). He underwent a repeat large volume thoracentesis on hospital day 4. The patient subsequently developed a tension pneumothorax, with a dramatic reduction in effusion size (Figure 1C, day 4, asterisk, arrow). A chest tube was placed, after which serial radiographs demonstrated resolution of the pneumothorax and recurrence of the effusion (Figure

1D). The radiographs demonstrate the movement of fluid between the peritoneal and pleural cavities (Figure 1C and E). In this case, the mechanism of pleural effusion was confirmed to be a hepatic hydrothorax *via* an unintended tension pneumothorax.

The diagnosis of hepatic hydrothorax should be considered for any patient with unilateral pleural effusion without an obvious cardio pulmonary cause. For cases in which the diagnosis is not obvious based on the clinical picture, methods to elucidate a hepatic hydrothorax include Tc99m labelled sulfur/albumin or indocyanine green injection into the ascitic fluid, followed by its demonstration above the diaphragm<sup>[2,3]</sup>.

The unintended tension pneumothorax in this case also demonstrates bi-directional flow across the diaphragm. As mentioned by Gaduputi *et al*<sup>[1]</sup>, fluid dynamics in hepatic hydrothorax are driven by pressure changes and pressure differences between the pleural, peritoneal cavities. In their patient, mechanical ventilation imparted positive pressure that was transmitted to the intrapleural space thereby causing the hydrothorax to track back to the peritoneal cavity which was relatively less pressurized<sup>[1]</sup>. Similarly, in our patient, a tension pneumothorax imparted positive pressure in the pleural cavity, forcing pleural fluid back into the peritoneal cavity. In both patients, after the source of positive intrapleural pressure was eliminated, the hydrothorax recurred, highlighting bi-directional flow.

While rapid, bi-directional, hepatic hydrothoraces may represent a subset of larger diaphragmatic defects, this phenomenon may be more common than judged by the scant available literature. It is in these cases that an opportunity exists to better delineate the pathophysiology

of hepatic hydrothoraces, and begin to conceive more robust therapeutic options than those currently available to patients. As it stands, hepatic hydrothorax is often a harbinger of further suffering.

---

## REFERENCES

---

1 **Gaduputi V**, Tariq H, Kanneganti K. A fascinating presentation of

- hepatic hydrothorax. *World J Hepatol* 2013; **5**: 589-591 [PMID: 24179619 DOI: 10.4254/wjh.v5.i10.589]
- 2 **Umino J**, Tanaka E, Ichijoh T, Muraki T, Orii K, Yoshizawa K, Kiyosawa K. Hepatic hydrothorax in the absence of ascites diagnosed by intraperitoneal spraying of indocyanine green. *Intern Med* 2004; **43**: 283-288 [PMID: 15168769]
- 3 **Bhattacharya A**, Mittal BR, Biswas T, Dhiman RK, Singh B, Jindal SK, Chawla Y. Radioisotope scintigraphy in the diagnosis of hepatic hydrothorax. *J Gastroenterol Hepatol* 2001; **16**: 317-321 [PMID: 11339424 DOI: 10.1046/j.1440-1746.2001.02441.x]

**P- Reviewer:** Sipos F, Wong GLH **S- Editor:** Kong JX **L- Editor:** A  
**E- Editor:** Li D





Published by **Baishideng Publishing Group Inc**  
7901 Stoneridge Drive, Pleasanton, CA 94588, USA  
Telephone: +1-925-223-8242  
Fax: +1-925-223-8243  
E-mail: [bpgoffice@wjgnet.com](mailto:bpgoffice@wjgnet.com)  
Help Desk: <http://www.f6publishing.com/helpdesk>  
<http://www.wjgnet.com>

