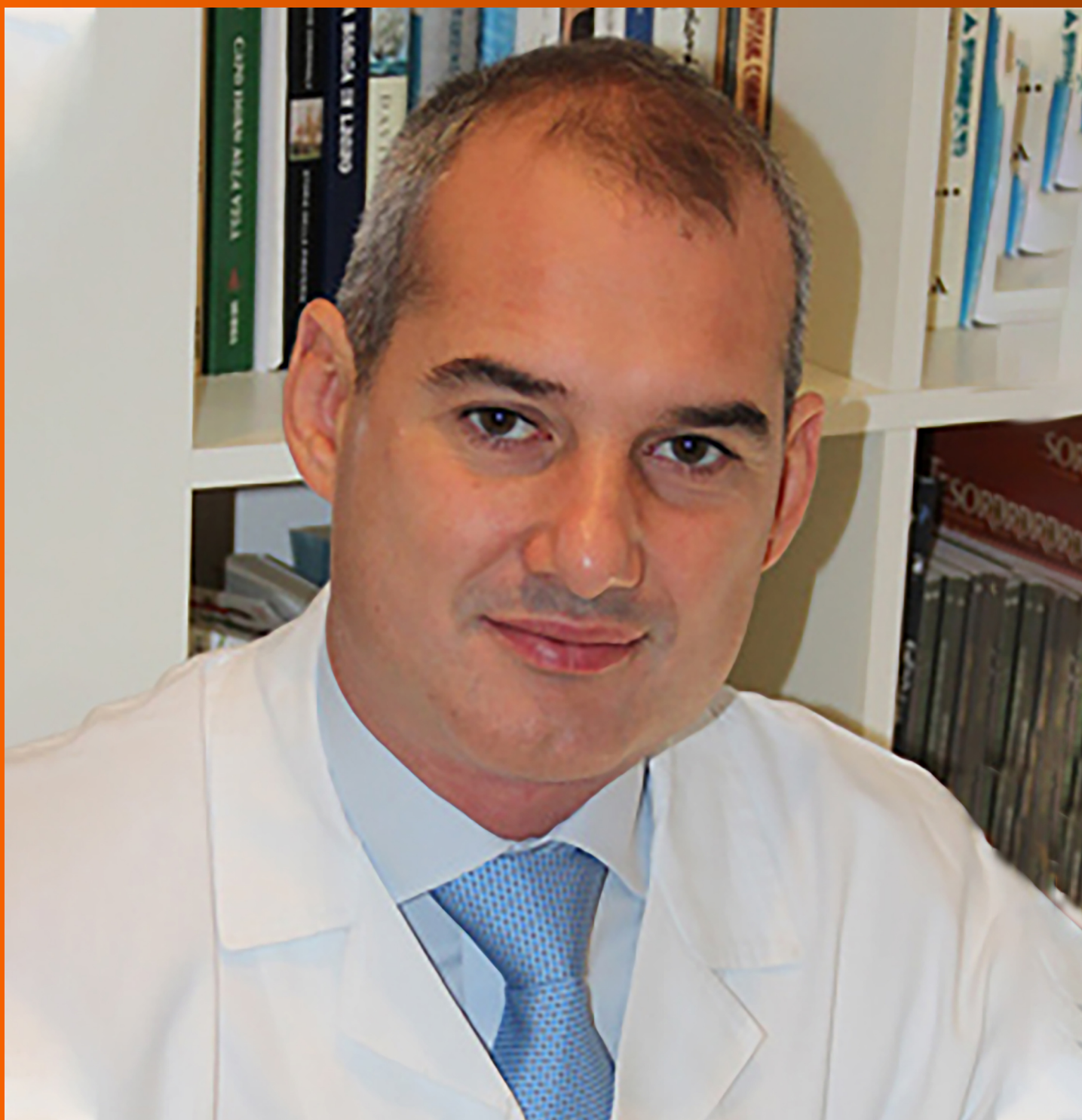


# World Journal of *Clinical Cases*

*World J Clin Cases* 2021 August 16; 9(23): 6582-6963



### OPINION REVIEW

- 6582** COVID-19 pandemic, as experienced in the surgical service of a district hospital in Spain  
*Pérez Lara FJ, Jimenez Martinez MB, Pozo Muñoz F, Fontalba Navas A, Garcia Cisneros R, Garcia Larrosa MJ, Garcia Delgado I, Callejon Gil MDM*

### REVIEW

- 6591** Beta-carotene and its protective effect on gastric cancer  
*Chen QH, Wu BK, Pan D, Sang LX, Chang B*
- 6608** Liver transplantation during global COVID-19 pandemic  
*Alfishawy M, Nso N, Nassar M, Ariyaratnam J, Bhuiyan S, Siddiqui RS, Li M, Chung H, Al Balakosy A, Alqassieh A, Fülöp T, Rizzo V, Daoud A, Soliman KM*
- 6624** Nonalcoholic fatty pancreas disease: An emerging clinical challenge  
*Zhang CL, Wang JJ, Li JN, Yang Y*

### MINIREVIEWS

- 6639** Novel mechanism of hepatobiliary system damage and immunoglobulin G4 elevation caused by *Clonorchis sinensis* infection  
*Zhang XH, Huang D, Li YL, Chang B*
- 6654** Intestinal microbiota participates in nonalcoholic fatty liver disease progression by affecting intestinal homeostasis  
*Zhang Y, Li JX, Zhang Y, Wang YL*
- 6663** Theory and reality of antivirals against SARS-CoV-2  
*Zhao B, Yang TF, Zheng R*
- 6674** Acute acalculous cholecystitis due to infectious causes  
*Markaki I, Konsoula A, Markaki L, Spornovasilis N, Papadakis M*

### ORIGINAL ARTICLE

#### Case Control Study

- 6686** Innate immunity – the hallmark of *Helicobacter pylori* infection in pediatric chronic gastritis  
*Meliş LE, Mărginean CO, Săsară MO, Mocan S, Ghiga DV, Bogliş A, Duicu C*

#### Retrospective Study

- 6698** Effects on newborns of applying bupivacaine combined with different doses of fentanyl for cesarean section  
*Wang Y, Liu WX, Zhou XH, Yang M, Liu X, Zhang Y, Hai KR, Ye QS*

- 6705** Awake fiberoptic intubation and use of bronchial blockers in ankylosing spondylitis patients  
*Yang SZ, Huang SS, Yi WB, Lv WW, Li L, Qi F*
- 6717** Efficacy of different antibiotics in treatment of children with respiratory mycoplasma infection  
*Zhang MY, Zhao Y, Liu JF, Liu GP, Zhang RY, Wang LM*
- 6725** Expression of caspase-3 and hypoxia inducible factor 1 $\alpha$  in hepatocellular carcinoma complicated by hemorrhage and necrosis  
*Liang H, Wu JG, Wang F, Chen BX, Zou ST, Wang C, Luo SW*
- 6734** Increased morbidity and mortality of hepatocellular carcinoma patients in lower cost of living areas  
*Sempokuya T, Patel KP, Azawi M, Ma J, Wong LL*

**SYSTEMATIC REVIEWS**

- 6747** Safety of pancreatic surgery with special reference to antithrombotic therapy: A systematic review of the literature  
*Fujikawa T, Naito S*
- 6759** What paradigm shifts occurred in the management of acute diverticulitis during the COVID-19 pandemic? A scoping review  
*Gallo G, Ortenzi M, Grossi U, Di Tanna GL, Pata F, Guerrieri M, Sammarco G, Di Saverio S*

**CASE REPORT**

- 6768** Pylephlebitis — a rare complication of a fish bone migration mimicking metastatic pancreatic cancer: A case report  
*Bezerra S, França NJ, Mineiro F, Capela G, Duarte C, Mendes AR*
- 6775** Solitary seminal vesicle metastasis from ileal adenocarcinoma presenting with hematospermia: A case report  
*Cheng XB, Lu ZQ, Lam W, Yiu MK, Li JS*
- 6781** Hepatic abscess caused by esophageal foreign body misdiagnosed as cystadenocarcinoma by magnetic resonance imaging: A case report  
*Pan W, Lin LJ, Meng ZW, Cai XR, Chen YL*
- 6789** 2+0 CYP21A2 deletion carrier — a limitation of the genetic testing and counseling: A case report  
*Xi N, Song X, Wang XY, Qin SF, He GN, Sun LL, Chen XM*
- 6798** Psoriasis treatment using minimally manipulated umbilical cord-derived mesenchymal stem cells: A case report  
*Ahn H, Lee SY, Jung WJ, Pi J, Lee KH*
- 6804** Double intussusception in a teenage child with Peutz-Jeghers syndrome: A case report  
*Chiew J, Sambanthan ST, Mahendran HA*

- 6810** Nedaplatin-induced syndrome of inappropriate secretion of antidiuretic hormone: A case report and review of the literature  
*Tian L, He LY, Zhang HZ*
- 6816** Nasal metastases from neuroblastoma-a rare entity: Two case reports  
*Zhang Y, Guan WB, Wang RF, Yu WW, Jiang RQ, Liu Y, Wang LF, Wang J*
- 6824** Nocardiosis with diffuse involvement of the pleura: A case report  
*Wang P, Yi ML, Zhang CZ*
- 6832** Prenatal diagnosis of triphalangeal thumb-polysyndactyly syndrome by ultrasonography combined with genetic testing: A case report  
*Zhang SJ, Lin HB, Jiang QX, He SZ, Lyu GR*
- 6839** Blue LED as a new treatment to vaginal stenosis due pelvic radiotherapy: Two case reports  
*Barros D, Alvares C, Alencar T, Baqueiro P, Marianno A, Alves R, Lenzi J, Rezende LF, Lordelo P*
- 6846** Diverse microbiota in palatal radicular groove analyzed by Illumina sequencing: Four case reports  
*Tan XL, Chen X, Fu YJ, Ye L, Zhang L, Huang DM*
- 6858** Autism with dysphasia accompanied by mental retardation caused by *FOXP1* exon deletion: A case report  
*Lin SZ, Zhou XY, Wang WQ, Jiang K*
- 6867** *FGFR2-TSC22D1*, a novel *FGFR2* fusion gene identified in a patient with colorectal cancer: A case report  
*Kao XM, Zhu X, Zhang JL, Chen SQ, Fan CG*
- 6872** Trismus originating from rare fungal myositis in pterygoid muscles: A case report  
*Bi L, Wei D, Wang B, He JF, Zhu HY, Wang HM*
- 6879** Retroperitoneal laparoscopic partial nephrectomy for unilateral synchronous multifocal renal carcinoma with different pathological types: A case report  
*Xiao YM, Yang SK, Wang Y, Mao D, Duan FL, Zhou SK*
- 6886** Diffuse large B cell lymphoma originating from the maxillary sinus with skin metastases: A case report and review of literature  
*Usuda D, Izumida T, Terada N, Sangen R, Higashikawa T, Sekiguchi S, Tanaka R, Suzuki M, Hotchi Y, Shimozawa S, Tokunaga S, Osugi I, Katou R, Ito S, Asako S, Takagi Y, Mishima K, Kondo A, Mizuno K, Takami H, Komatsu T, Oba J, Nomura T, Sugita M, Kasamaki Y*
- 6900** Manifestation of acute peritonitis and pneumonedema in scrub typhus without eschar: A case report  
*Zhou XL, Ye QL, Chen JQ, Li W, Dong HJ*
- 6907** Uterine tumor resembling an ovarian sex cord tumor: A case report and review of literature  
*Zhou FF, He YT, Li Y, Zhang M, Chen FH*
- 6916** Dopamine agonist responsive burning mouth syndrome: Report of eight cases  
*Du QC, Ge YY, Xiao WL, Wang WF*

- 6922** Complete withdrawal of glucocorticoids after dupilumab therapy in allergic bronchopulmonary aspergillosis: A case report  
*Nishimura T, Okano T, Naito M, Tsuji C, Iwanaka S, Sakakura Y, Yasuma T, Fujimoto H, D'Alessandro-Gabazza CN, Oomoto Y, Kobayashi T, Gabazza EC, Ibata H*
- 6929** Sirolimus treatment for neonate with blue rubber bleb nevus syndrome: A case report  
*Yang SS, Yang M, Yue XJ, Tou JF*
- 6935** Combined thoracoscopic and laparoscopic approach to remove a large retroperitoneal compound paraganglioma: A case report  
*Liu C, Wen J, Li HZ, Ji ZG*
- 6943** Menetrier's disease and differential diagnosis: A case report  
*Wang HH, Zhao CC, Wang XL, Cheng ZN, Xie ZY*
- 6950** Post-salpingectomy interstitial heterotopic pregnancy after *in vitro* fertilization and embryo transfer: A case report  
*Wang Q, Pan XL, Qi XR*
- 6956** Ulnar nerve injury associated with displaced distal radius fracture: Two case reports  
*Yang JJ, Qu W, Wu YX, Jiang HJ*

**ABOUT COVER**

Editorial Board Member of *World Journal of Clinical Cases*, Luigi Valentino Berra, MD, Assistant Professor, Neurosurgeon, Department of Neurosurgery, Policlinico Umberto I - Sapienza Università di Roma, Roma 00161, Italy. luigivbe@tin.it

**AIMS AND SCOPE**

The primary aim of *World Journal of Clinical Cases* (WJCC, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

**INDEXING/ABSTRACTING**

The WJCC is now indexed in Science Citation Index Expanded (also known as SciSearch®), Journal Citation Reports/Science Edition, Scopus, PubMed, and PubMed Central. The 2021 Edition of Journal Citation Reports® cites the 2020 impact factor (IF) for WJCC as 1.337; IF without journal self cites: 1.301; 5-year IF: 1.742; Journal Citation Indicator: 0.33; Ranking: 119 among 169 journals in medicine, general and internal; and Quartile category: Q3. The WJCC's CiteScore for 2020 is 0.8 and Scopus CiteScore rank 2020: General Medicine is 493/793.

**RESPONSIBLE EDITORS FOR THIS ISSUE**

Production Editor: Jia-Hui Li; Production Department Director: Xiang Li; Editorial Office Director: Jin-Lei Wang.

**NAME OF JOURNAL**

*World Journal of Clinical Cases*

**ISSN**

ISSN 2307-8960 (online)

**LAUNCH DATE**

April 16, 2013

**FREQUENCY**

Thrice Monthly

**EDITORS-IN-CHIEF**

Dennis A Bloomfield, Sandro Vento, Bao-Gan Peng

**EDITORIAL BOARD MEMBERS**

<https://www.wjgnet.com/2307-8960/editorialboard.htm>

**PUBLICATION DATE**

August 16, 2021

**COPYRIGHT**

© 2021 Baishideng Publishing Group Inc

**INSTRUCTIONS TO AUTHORS**

<https://www.wjgnet.com/bpg/gerinfo/204>

**GUIDELINES FOR ETHICS DOCUMENTS**

<https://www.wjgnet.com/bpg/GerInfo/287>

**GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH**

<https://www.wjgnet.com/bpg/gerinfo/240>

**PUBLICATION ETHICS**

<https://www.wjgnet.com/bpg/GerInfo/288>

**PUBLICATION MISCONDUCT**

<https://www.wjgnet.com/bpg/gerinfo/208>

**ARTICLE PROCESSING CHARGE**

<https://www.wjgnet.com/bpg/gerinfo/242>

**STEPS FOR SUBMITTING MANUSCRIPTS**

<https://www.wjgnet.com/bpg/GerInfo/239>

**ONLINE SUBMISSION**

<https://www.f6publishing.com>





## Double intussusception in a teenage child with Peutz-Jeghers syndrome: A case report

Junloong Chiew, Sekkapan Thannimalai Sambanthan, Hans Alexander Mahendran

**ORCID number:** Junloong Chiew 0000-0002-4097-848X; Sekkapan Thannimalai Sambanthan 0000-0002-0001-1119; Hans Alexander Mahendran 0000-0003-0566-7181.

**Author contributions:** Chiew J was the attending doctor of the patient, collected the patient's clinic information, searched relevant works of literature, and wrote the manuscript; Sambanthan ST and Mahendran HA carried out critical revision and correction of the manuscript; all authors read and approved the final manuscript for submission and publication.

**Informed consent statement:**

Written consent was obtained from the patient's mother.

**Conflict-of-interest statement:** The authors declare that they have no competing interests.

**CARE Checklist (2016) statement:**

The authors have read the CARE Checklist, and the manuscript was prepared and revised according to the CARE Checklist.

**Open-Access:** This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0)

**Junloong Chiew, Sekkapan Thannimalai Sambanthan, Hans Alexander Mahendran,** Department of Surgery, Hospital Sultanah Aminah, Johor Bahru 80100, Malaysia

**Corresponding author:** Junloong Chiew, MBBS, Doctor, Department of Surgery, Hospital Sultanah Aminah, Jalan Persiaran Abu Bakar Sultan, Johor Bahru 80100, Malaysia.  
[chiewjunloong@gmail.com](mailto:chiewjunloong@gmail.com)

### Abstract

#### BACKGROUND

Peutz-Jeghers syndrome (PJS) is a genetic disorder characterized by the development of gastrointestinal hamartomatous polyps and mucocutaneous melanin pigmentation. Patients with PJS are at risk of complications such as intussusception. Intussusception is a condition where one segment of the intestine invaginates into another, causing intestinal obstruction. We report a PJS patient who was diagnosed with double intussusception in a single setting.

#### CASE SUMMARY

A 16-year-old teenage male PJS patient presented with a history of colicky abdominal pain, vomiting, blood in stools, loss of appetite, and weight loss. On abdominal examination, a vague mass was palpable over the right upper quadrant. Contrast-enhanced computed tomography (CT) of the abdomen was performed and an intussusception involving the jejunum and rectosigmoid junction was observed. The patient subsequently underwent a laparotomy and intussusception involving the jejunum and another over the ileum was noted intra-operatively. Bowel resection and an endoscopic polypectomy were performed, followed by a primary anastomosis. The patient was discharged well and reviewed again one month later, and was noted to be well.

#### CONCLUSION

PJS patients have a high risk of intussusception and can be diagnosed accurately by endoscopic surveillance or radiologically with abdominal CT or magnetic resonance imaging. The mainstay of treatment is surgical intervention followed by endoscopic surveillance with periodic polypectomy.

**Key Words:** Peutz-Jeghers syndrome; Intussusception; Case report

©The Author(s) 2021. Published by Baishideng Publishing Group Inc. All rights reserved.

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

**Specialty type:** Surgery

**Country/Territory of origin:** Malaysia

**Peer-review report's scientific quality classification**

Grade A (Excellent): 0  
Grade B (Very good): 0  
Grade C (Good): C  
Grade D (Fair): 0  
Grade E (Poor): 0

**Received:** January 15, 2021

**Peer-review started:** January 15, 2021

**First decision:** February 28, 2021

**Revised:** March 14, 2021

**Accepted:** May 15, 2021

**Article in press:** May 15, 2021

**Published online:** August 16, 2021

**P-Reviewer:** Di Nardo G

**S-Editor:** Wang JL

**L-Editor:** Webster JR

**P-Editor:** Ma YJ



**Core Tip:** Peutz-Jeghers syndrome (PJS) is a genetic disorder characterized by the development of gastrointestinal hamartomatous polyps and mucocutaneous melanin pigmentation. Patients with PJS are at risk of complications such as intussusception. Intussusception is a condition where one segment of the intestine invaginates into another, causing intestinal obstruction. We report a PJS patient who was diagnosed with double intussusception in a single setting.

**Citation:** Chiew J, Sambanthan ST, Mahendran HA. Double intussusception in a teenage child with Peutz-Jeghers syndrome: A case report. *World J Clin Cases* 2021; 9(23): 6804-6809

**URL:** <https://www.wjgnet.com/2307-8960/full/v9/i23/6804.htm>

**DOI:** <https://dx.doi.org/10.12998/wjcc.v9.i23.6804>

## INTRODUCTION

Peutz-Jeghers syndrome (PJS) is an autosomal dominant genetic disorder characterized by the development of gastrointestinal hamartomatous polyps and mucocutaneous melanin pigmentation. Patients with PJS are at risk of intussusception, which is a condition where one segment of the intestine invaginates into another, causing intestinal obstruction. We report the case of a 16-year-old male patient with underlying PJS complicated by intussusception at 2 different sites in the same setting.

## CASE PRESENTATION

### Chief complaints

A 16-year-old Malay male presented to the Emergency Department of our hospital complaining of worsening abdominal pain.

### History of present illness

The patient presented with a history of colicky abdominal pain for 1 year and was associated with a history of vomiting, blood in stools, loss of appetite, and loss of weight.

### History of past illness

The patient had previously been diagnosed with PJS but had defaulted on subsequent follow-ups.

### Personal and family history

No significant family history or surgical history was noted.

### Physical examination

His vital signs were unremarkable, and on abdominal examination, a vague mass was palpable over the right upper quadrant.

### Laboratory examinations

Blood analyses were unremarkable.

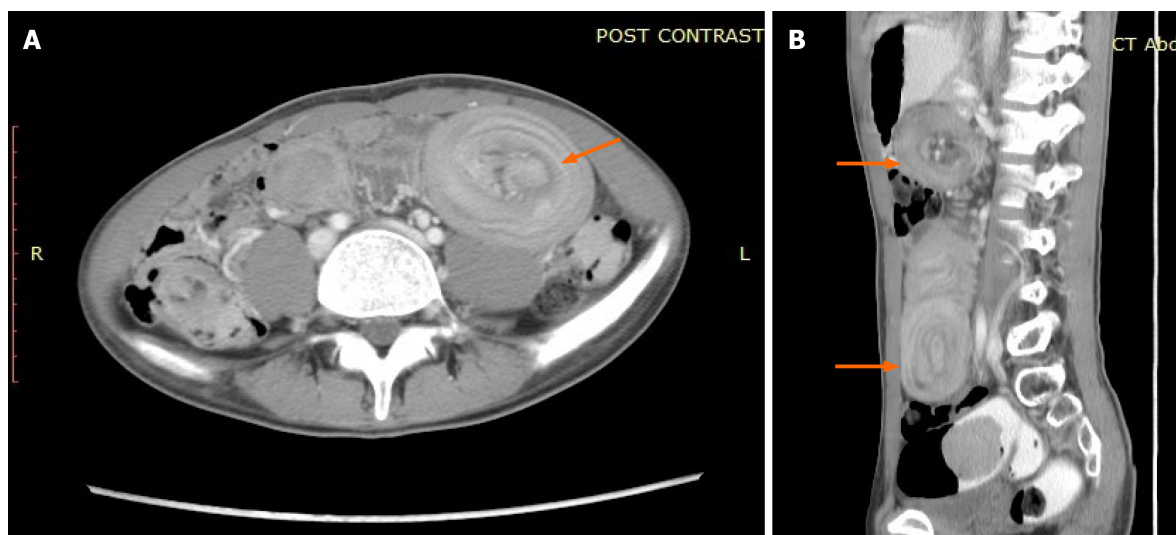
### Imaging examinations

Contrast-enhanced computed tomography (CT) of the abdomen revealed a long segment intussusception in the small bowel extending from the left upper abdomen to the right lower abdomen involving the jejunum and another intussusception involving the rectosigmoid junction (Figure 1A and B).

## FINAL DIAGNOSIS

Intussusception secondary to PJS.





**Figure 1** Computed tomography scan of the patient. A: Computed tomography (CT) axial view showing intussusception of the small bowel; B: CT sagittal view showing intussusception at 2 different sites.

## TREATMENT

The patient underwent laparotomy. Intra-operatively, there were 2 intussusceptions over the jejunum (Figure 2A) and ileum (Figure 2B) with around 140 cm of bowel length between the 2 intussusceptions. We were able to reduce both intussusceptions; however, we noted multiple large polyps of varying sizes in the area (largest 3-4 cm); hence, it was decided to resect both areas of bowel. Prior to the primary anastomosis of the resected bowels, a gastroscope was inserted through the proximal jejunum, and any visible gastric and duodenal polyps were resected.

## OUTCOME AND FOLLOW-UP

The postoperative course was uneventful, and the patient was discharged well. Upon review one-month post-discharge, the patient was noted to be well.

## DISCUSSION

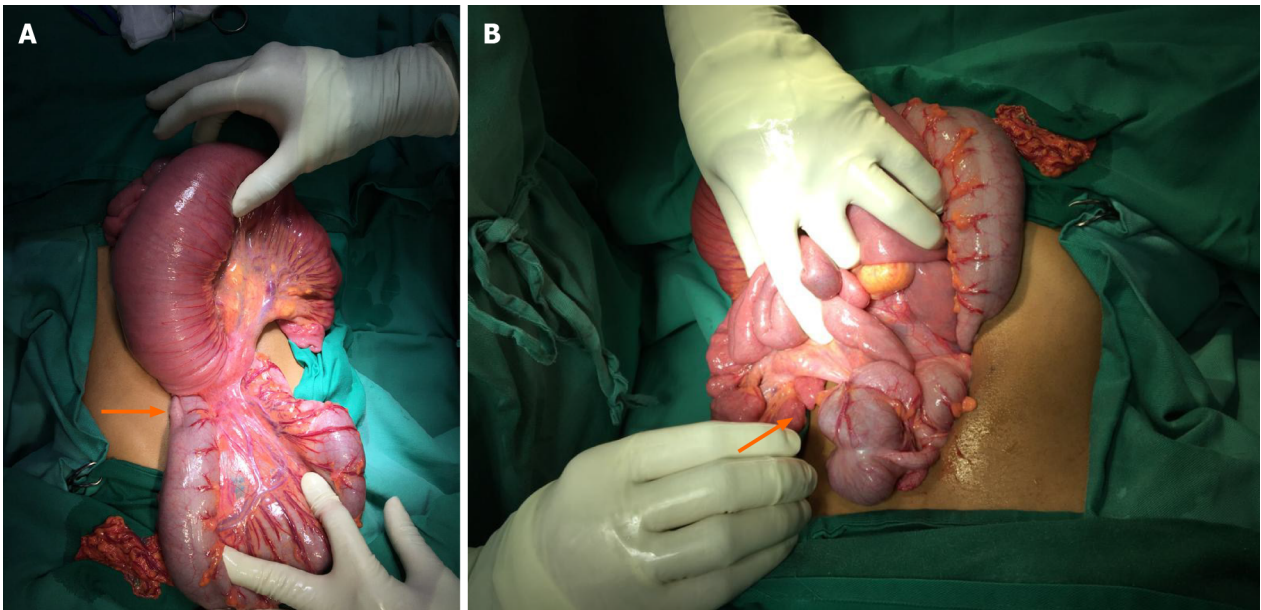
PJS was first described in literature published in 1895 by Dr. Connor, a British physician who reported identical twin sister's with oral pigmentation. One sister died due to intestinal obstruction age 20 years while the other died due to breast cancer aged 59 years[1].

Intussusception was also described as a complication in the year 1942 by Peutz, a German physician. The report described the typical features of a patient with PJS suffering from intussusception, including facial and perioral hyperpigmentation, intermittent abdominal pain, and rectal bleeding. Further analysis of the syndrome led the said physician to conclude that the disease was an autosomal dominant condition [2].

Later, in 1998, it was discovered that the cause of PJS was a mutation in the *STK11* gene, also known as the *LKB1* gene[3]. *STK11/LKB1* genetic mutation is found in around 30% to 70% of PJS patients and in around 70% of patients with a positive family history[4].

The diagnosis of PJS can be made with the presence of hamartomatous polyps in patients with the addition of 2 of the following clinical criteria: labial melanin deposits, positive family history of the syndrome, and small bowel polyposis[5].

The classical triad for intussusception of abdominal pain, mass, and bloody stool was present in our patient. Patients with PJS generally have hundreds of polyposis and are mainly distributed in the small intestine, followed by the large intestine and stomach. Usually, the intestinal polyps are pedunculated, while the polyps in the stomach are broad-based and hamartomatous histologically[6].



**Figure 2 Intraoperative findings.** A: Intussusception at the ileum; B: Intussusception at the jejunum.

These patients are at risk of malignant neoplasm transformation. In 1983, Tovar *et al* [7] described that 7.14% of children with PJS subsequently developed malignancy, with gonadal tumors being the most common.

Baeza-Herrera *et al* [2] in 2005, reported that 1.4% of children with PJS also had intussusception. The relationship between PJS and intussusception is a known and predictable outcome as intestinal polyps can increase the risk of the intestine introducing within itself [2].

Nowadays, conventional barium studies have been replaced with more advanced cross-sectional techniques such as ultrasonography, CT, and magnetic resonance imaging (MRI). Ultrasonography will typically show a “doughnut” or a “target” sign picture; however, in this patient, ultrasound was not performed. An abdominal CT scan is the most useful imaging modality as it is helpful in revealing the underlying lesion [8]. Although barium enema can also help in diagnosing intestinal intussusception, a multicenter study by Barussaud *et al* [9] reported that CT associated or not with barium enema may be the most accurate modality for diagnosis of intussusception in adults. However, the overall diagnostic approach still depends on the patient's clinical presentation.

Definitive surgical intervention is recommended in PJS patients complicated by intestinal obstruction, evidence of malignancy, or considerable gastrointestinal hemorrhage [10-12]. In our case, the patient was complicated by intestinal obstruction caused by intussusceptions due to intestinal polyps.

In a large majority of children with PJS, the existing number of polyps is usually large, causing them to have a recurrent crisis of intussusception that disappears as fast as it appear. It may be due to the large number of polyps present in a short segment of the intestine which causes the intussusception to reoccur, and the child may need multiple surgeries [2].

With the advent of emerging endoscopic techniques, combined endoscopic and surgical interventions have been performed successfully in the reduction of an ileoileal intussusception followed by a double-balloon endoscopic (DBE) resection of the polyp [13,14].

The usage of DBE avoids the need for urgent laparotomy in which the patient can limit the risk of the development of short bowel syndrome. However, this can be limited by the lack of resources in some centers.

In the event of signs suggesting bowel ischemia or peritonitis, an emergency laparotomy is still the preferred choice. In patients with bowel ischemia or an irreversible correction, *en bloc* removal of the affected intestine followed by a primary anastomosis is recommended. Once the derivation is planned, enterostomies and intra-operative endoscopy must be utilized to extract the highest number of polyps as possible as the disease will produce recurrent intussusceptions [2].

In our case, we were able to perform endoscopic polypectomy for the large polyps preventing future reoccurrence of intussusception and intraoperatively, the patient did

not require major resection except for the intussusception segment. However, we were unable to address the polyps in the entire small bowel as it may cause short bowel syndrome if resected.

## CONCLUSION

PJS is an autosomal dominant condition characterized by hamartomatous polyps primarily in the small intestine and mucocutaneous pigmentation. PJS patients have a high risk of intussusception, especially in the younger age group.

Hence, patients with PJS are strongly recommended to have regular follow-up examinations and periodic polypectomy of the entire small bowel to prevent complications[15].

Wireless capsule endoscopy is an emerging and popular diagnostic method and has been found to have a higher diagnostic yield of polyps found as compared to a CT or MRI study[16]. CT and MRI with oral contrast are other options for screening, in which MRI is more advantageous when compared to CT as it prevents young people from being exposed to high doses of radiation and has a higher accuracy rate.

Treatment is mainly surgical intervention followed by endoscopic or radiological surveillance with periodic polypectomy. Patients with PJS should have regular follow-up throughout their lives as they are at risk of malignant transformation.

## ACKNOWLEDGEMENTS

We would like to thank the Director-General of Health Malaysia for his permission to publish this article. We would also like to express our gratitude to the Surgical Department of Hospital Sultanah Aminah Johor Bahru, and those who have extended their help in contributing to this manuscript.

## REFERENCES

- 1 Connor JT. Aesculapian society of London. *Lancet* 1895; **2**: 1169
- 2 Baeza-Herrera C, García-Cabello LM, Nájera-Garduño HM, Sánchez-Fernández LA, Mora-Hernández F, Ortiz-Zúñiga AI. Surgical aspects of intussusception secondary to Peutz-Jeghers syndrome. *Cir Cir* 2005; **73**: 91-95 [PMID: 15910700]
- 3 Hemminki A, Markie D, Tomlinson I, Avizienyte E, Roth S, Loukola A, Bignell G, Warren W, Aminoff M, Höglund P, Järvinen H, Kristo P, Pelin K, Ridanpää M, Salovaara R, Toro T, Bodmer W, Olschwang S, Olsen AS, Stratton MR, de la Chapelle A, Aaltonen LA. A serine/threonine kinase gene defective in Peutz-Jeghers syndrome. *Nature* 1998; **391**: 184-187 [PMID: 9428765 DOI: 10.1038/34432]
- 4 Jenne DE, Reimann H, Nezu J, Friedel W, Loff S, Jeschke R, Müller O, Back W, Zimmer M. Peutz-Jeghers syndrome is caused by mutations in a novel serine threonine kinase. *Nat Genet* 1998; **18**: 38-43 [PMID: 9425897 DOI: 10.1038/ng0198-38]
- 5 Giardiello FM, Trimbath JD. Peutz-Jeghers syndrome and management recommendations. *Clin Gastroenterol Hepatol* 2006; **4**: 408-415 [PMID: 16616343 DOI: 10.1016/j.cgh.2005.11.005]
- 6 McGarrity TJ, Kulin HE, Zaino RJ. Peutz-Jeghers syndrome. *Am J Gastroenterol* 2000; **95**: 596-604 [PMID: 10710046 DOI: 10.1111/j.1572-0241.2000.01831.x]
- 7 Tovar JA, Eizaguirre I, Albert A, Jimenez J. Peutz-Jeghers syndrome in children: report of two cases and review of the literature. *J Pediatr Surg* 1983; **18**: 1-6 [PMID: 6834218 DOI: 10.1016/s0022-3468(83)80262-0]
- 8 Wang H, Luo T, Liu WQ, Huang Y, Wu XT, Wang XJ. Clinical presentations and surgical approach of acute intussusception caused by Peutz-Jeghers syndrome in adults. *J Gastrointest Surg* 2011; **15**: 2218-2225 [PMID: 22005897 DOI: 10.1007/s11605-011-1724-2]
- 9 Barussaud M, Regenet N, Briennon X, de Kerviler B, Pessaix P, Kohnen-Sharhi N, Lehur PA, Hamy A, Leborgne J, le Neel JC, Mirallie E. Clinical spectrum and surgical approach of adult intussusceptions: a multicentric study. *Int J Colorectal Dis* 2006; **21**: 834-839 [PMID: 15951987 DOI: 10.1007/s00384-005-0789-3]
- 10 Fraser JD, Briggs SE, St Peter SD, De Petris G, Heppell J. Intussusception in the adult: an unsuspected case of Peutz-Jeghers syndrome with review of the literature. *Fam Cancer* 2009; **8**: 95-101 [PMID: 18726167 DOI: 10.1007/s10689-008-9212-x]
- 11 Gonzalez AM, Clapp B. Laparoscopic management of small bowel intussusception in a 16-year-old with Peutz-Jeghers syndrome. *JSLs* 2008; **12**: 332-334 [PMID: 18765065]
- 12 Akimaru K, Katoh S, Ishiguro S, Miyake K, Shimanuki K, Tajiri T. Resection of over 290 polyps

- during emergency surgery for four intussusceptions with Peutz-Jeghers syndrome: Report of a case. *Surg Today* 2006; **36**: 997-1002 [PMID: [17072723](#) DOI: [10.1007/s00595-006-3282-x](#)]
- 13 **Miura Y**, Yamamoto H, Sunada K, Yano T, Arashiro M, Miyata T, Sugano K. Reduction of ileoileal intussusception by using double-balloon endoscopy in Peutz-Jeghers syndrome (with video). *Gastrointest Endosc* 2010; **72**: 658-659 [PMID: [20231020](#) DOI: [10.1016/j.gie.2009.11.045](#)]
  - 14 **Sakamoto H**, Yamamoto H, Hayashi Y, Yano T, Miyata T, Nishimura N, Shinhata H, Sato H, Sunada K, Sugano K. Nonsurgical management of small-bowel polyps in Peutz-Jeghers syndrome with extensive polypectomy by using double-balloon endoscopy. *Gastrointest Endosc* 2011; **74**: 328-333 [PMID: [21704992](#) DOI: [10.1016/j.gie.2011.04.001](#)]
  - 15 **Oncel M**, Remzi FH, Church JM, Connor JT, Fazio VW. Benefits of 'clean sweep' in Peutz-Jeghers patients. *Colorectal Dis* 2004; **6**: 332-335 [PMID: [15335366](#) DOI: [10.1111/j.1463-1318.2004.00623.x](#)]
  - 16 **Kopacova M**, Tacheci I, Rejchrt S, Bures J. Peutz-Jeghers syndrome: diagnostic and therapeutic approach. *World J Gastroenterol* 2009; **15**: 5397-5408 [PMID: [19916169](#) DOI: [10.3748/wjg.15.5397](#)]



Published by **Baishideng Publishing Group Inc**  
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

**Telephone:** +1-925-3991568

**E-mail:** [bpgoffice@wjgnet.com](mailto:bpgoffice@wjgnet.com)

**Help Desk:** <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

