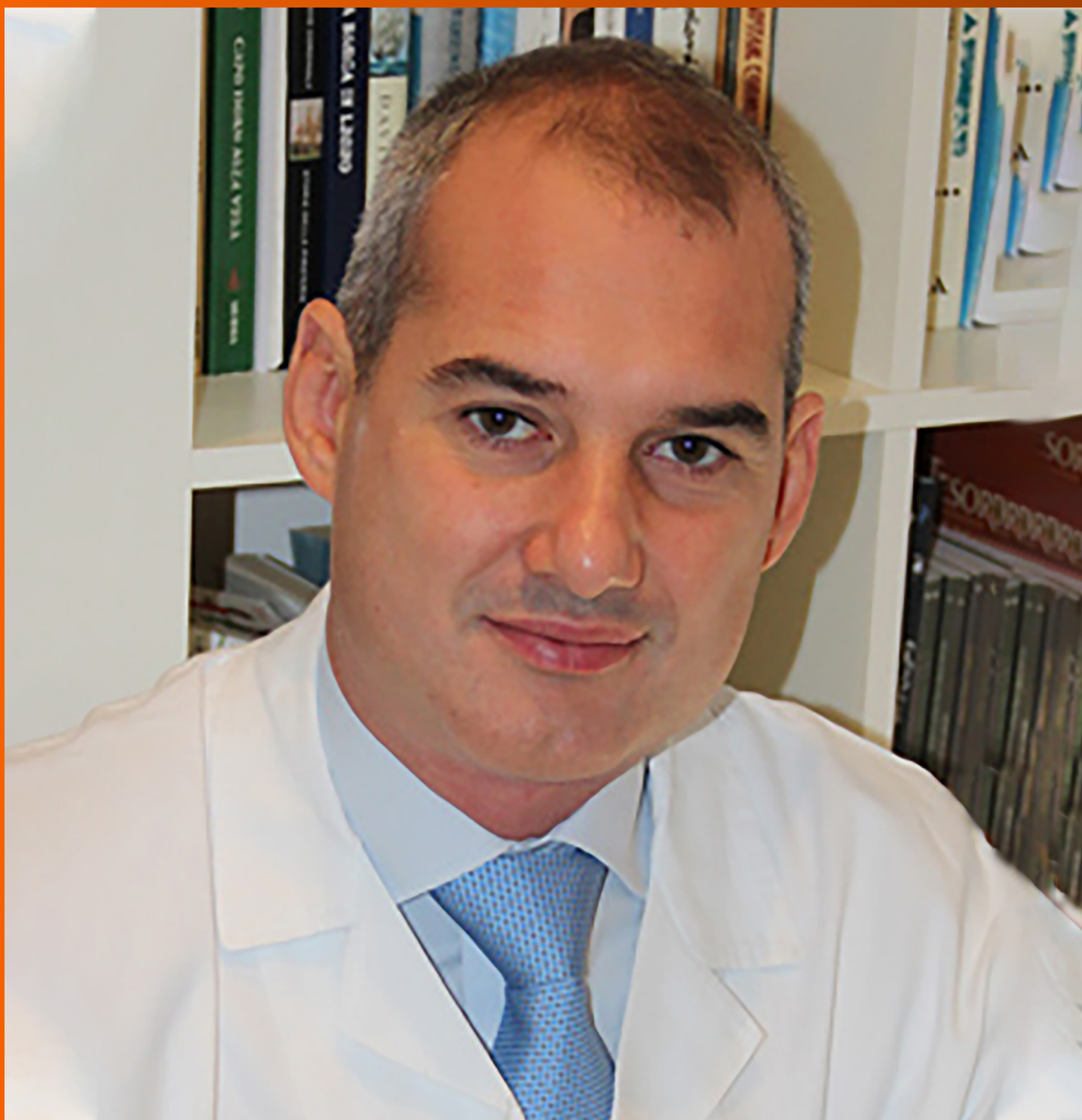


World Journal of *Clinical Cases*

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 α 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, Shimoizawa 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.wjnet.com/2307-8960/editorialboard.htm>

PUBLICATION DATE

August 16, 2021

COPYRIGHT

© 2021 Baishideng Publishing Group Inc

INSTRUCTIONS TO AUTHORS

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

GUIDELINES FOR ETHICS DOCUMENTS

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

GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH

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

PUBLICATION ETHICS

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

PUBLICATION MISCONDUCT

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

ARTICLE PROCESSING CHARGE

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

STEPS FOR SUBMITTING MANUSCRIPTS

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

ONLINE SUBMISSION

<https://www.f6publishing.com>



FGFR2-TSC22D1, a novel FGFR2 fusion gene identified in a patient with colorectal cancer: A case report

Xiao-Ming Kao, Xi Zhu, Jun-Ling Zhang, Shi-Qing Chen, Chao-Gang Fan

ORCID number: Xiao-Ming Kao 0000-0003-3518-7583; Xi Zhu 0000-0003-3518-7582; Jun-Ling Zhang 0000-0002-8618-3471; Shi-Qing Chen 0000-0003-3518-7587; Chao-Gang Fan 0000-0003-3518-7584.

Author contributions: Fan CG performed the conception and design of the study; Kao XM and Zhu X performed the acquisition of clinical data; Zhang JL and Chen SQ performed the analysis and interpretation of the data; Fan CG and Kao XM performed the manuscript drafting and revision; all authors performed the final approval of the manuscript.

Informed consent statement: Informed written consent was obtained from the patient for publication of this report and any accompanying images.

Conflict-of-interest statement: JZ and SC were employed by Shanghai 3D Medicines Inc. The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

CARE Checklist (2016) statement: The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE

Xiao-Ming Kao, Xi Zhu, Research Institute of General Surgery, Jinling Hospital, Nanjing 210002, Jiangsu Province, China

Jun-Ling Zhang, Shi-Qing Chen, Department of Medical, 3D Medicines Inc., Shanghai 201114, China

Chao-Gang Fan, Department of General Surgery, The Affiliated BenQ Hospital of Nanjing Medical University, Nanjing 210002, Jiangsu Province, China

Corresponding author: Chao-Gang Fan, PhD, Chief Doctor, Department of General Surgery, The Affiliated BenQ Hospital of Nanjing Medical University, No. 71 Hexi Street, Jianye District, Nanjing 210002, Jiangsu Province, China. fancg2002@hotmail.com

Abstract

BACKGROUND

The FGFR signaling pathway is activated in multiple tumor types through gene amplifications, single base substitutions, or gene fusions. Novel *FGFR* gene fusions may represent candidate targets for the development of tyrosine kinase inhibitors.

CASE SUMMARY

Herein, we report a patient with colorectal cancer (CRC) harboring a novel *FGFR2* fusion gene. A 59-year-old man felt discomfort in his right upper abdomen with loss of appetite for 6 mo. An abdominal computed tomography scan revealed the existence of a space-occupying lesion in the ascending colon. The pathological diagnosis was a poorly differentiated adenocarcinoma. Subsequent biopsy specimen was subjected to next-generation sequencing analysis, and a novel *FGFR2-TSC22D1* fusion with complete kinase structure of *FGFR2* protein was identified.

CONCLUSION

We report the first case of CRC harboring *FGFR2-TSC22D1*, which enriches the *FGFR2* fusion spectrum. *FGFR2* inhibitors might be effective in the later treatment for this patient.

Key Words: *FGFR2-TSC22D1*; Colorectal cancer; Next-generation sequencing; Case report

Checklist (2016).

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) 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: Medicine, research and experimental

Country/Territory of origin: China

Peer-review report's scientific quality classification

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

Received: March 17, 2021

Peer-review started: March 17, 2021

First decision: April 4, 2021

Revised: April 13, 2021

Accepted: June 28, 2021

Article in press: June 28, 2021

Published online: August 16, 2021

P-Reviewer: Kraja F, Valiveti CK

S-Editor: Fan JR

L-Editor: Wang TQ

P-Editor: Li JH



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

Core Tip: A colorectal cancer patient had a novel *FGFR2-TSC22D1* fusion which included exons 1-17 of *FGFR2* and exons 3 of *TSC22D1*. This fusion contains *FGFR2* kinase domain and coil coiled domains encoded by *TSC22D1* exon 3, which might induce oncogenesis. Our case enriches the *FGFR2* fusion spectrum. We believe that these novel findings have important implications in the strategy development of therapy for colorectal cancer.

Citation: Kao XM, Zhu X, Zhang JL, Chen SQ, Fan CG. *FGFR2-TSC22D1*, a novel *FGFR2* fusion gene identified in a patient with colorectal cancer: A case report. *World J Clin Cases* 2021; 9(23): 6867-6871

URL: <https://www.wjgnet.com/2307-8960/full/v9/i23/6867.htm>

DOI: <https://dx.doi.org/10.12998/wjcc.v9.i23.6867>

INTRODUCTION

Colorectal cancer (CRC) is one of the most common causes of cancer-related death worldwide and the 3rd most common cancer in males[1]. In recent years, the burden of CRC is increasing rapidly in China[2]. With the advent of targeted drugs such as epidermal growth factor or vascular endothelial growth factor tyrosine kinase inhibitors (TKIs), the overall survival of CRC increased from the past 8-12 mo to 30 mo nowadays[3-5].

FGFR fusions in solid tumors are caused by chromosomal rearrangements. *FGFR* families includes *FGFR1-4*, four highly conserved receptor tyrosine kinases, among which *FGFR2* has been proven to be a potential target of *FGFR* TKI inhibitors. At the same time, in many solid tumors, such as urothelial carcinomas and intrahepatic cholangiocarcinomas, *FGFR* activating molecular alterations (including *FGFR3* mutations and *FGFR2* fusions) have been found, expanding the options for patients who may benefit from *FGFR* inhibitors[6]. With the development of next generation sequencing (NGS), some uncommon genomic mutations are detected, such as *FGFR2-PPLN1*[7], *FGFR2-BICC1*[8], and *FGFR2-CCDC6* fusion mutations[9]. In this case, with the help of NGS detection technology, we found a CRC patient carrying a rare *FGFR2-TSC22D1* fusion gene, which further expanded the *FGFR2* fusion variant spectrum.

CASE PRESENTATION

Chief complaints

A 59-year-old male patient with right upper quadrant pain and discomfort, and no appetite for 6 mo, was referred to our hospital for further treatment.

History of present illness

Six months ago, the patient developed right upper abdominal distension, pain, and discomfort without obvious inducement, accompanied by anorexia. No nausea, vomiting, chills, high fever, palpitation, shortness of breath, or yellow staining of skin and mucous membrane was noted. At a local hospital, colorectal examination revealed an ulcerative mass in the liver flexure of the ascending colon. There was a 0.6 cm × 0.6 cm polyp in the middle of the transverse colon. Pathological report suggested that the ascending colon mass was poorly differentiated adenocarcinoma.

Physical examination

Physical examination revealed that the patient's body temperature was 36.8 °C, heart rate 78 bpm/min, respiratory 16 bpm/min, and blood pressure 122/78 mmHg.

Laboratory examinations

The white cell count was $9.46 \times 10^9/L$, hemoglobin was 62 g/mL, and platelet count

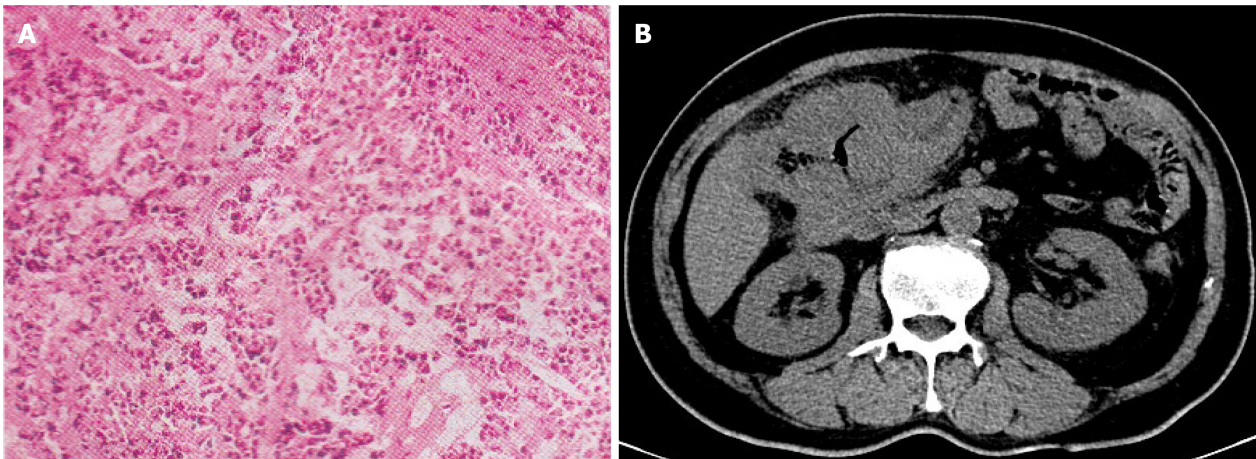


Figure 1 Pathological detection. A: Hematoxylin and eosin staining; B: Abdominal computed tomography showed a tumor lesion in the ascending colon.

was $451 \times 10^9/L$. Serum tumor markers carcinoembryonic antigen (7.58 ng/mL), carbohydrate antigen (CA)19-9 (21.63 U/mL), CA125 (44.85 U/mL), CA242 (21.57 IU/mL), CA724 (8.38 IU/mL), and CA153 (4.59 IU/mL) were detectable.

The pathological diagnosis under ascending colonoscopy was poorly differentiated adenocarcinoma (cT4N+M0, **Figure 1**).

The tissue biopsy specimens were then analyzed by NGS and a rare intergenic region between *FGFR2* and *TSC22D1* fusion variation was detected (**Figure 2A and B**). *TSC22D1* (TSC22 domain family protein 1) gene is a transcription factor belonging to a large family of early response. Dimers of *TSC22D1* act as a transcription factor and have tumor suppressor function. The *FGFR2-TSC22D1* fusion gene includes exons 1-17 of *FGFR2* and exons 3 of *TSC22D1*, retaining the complete kinase structure of *FGFR2*. The ratio of FAM-positivity (*FGFR2* gene) to VIC (internal reference gene) was 0.0048 in droplet digital polymerase chain reaction (ddPCR), indicating weakly *FGFR2* expression (**Figure 2C**) and proving that *FGFR2* was positive.

Imaging examinations

A computed tomography scan of the abdomen showed the presence of a space-occupying lesion in the liver flexure of the ascending colon.

FINAL DIAGNOSIS

The patient was finally diagnosed as having stage cT4N+M0 CRC and carrying the novel *FGFR2-TSC22D1* fusion gene.

TREATMENT

Based on pathological staging, the patient was given preoperative chemotherapy for tumor down-staging. The regimen is oxaliplatin (200 mg, D1, intravenous drips) plus capecitabine (1500 mg, D1-14, oral). After six cycles of preoperative chemotherapy, the patient underwent radical resection for CRC.

OUTCOME AND FOLLOW-UP

Postoperative pathology showed that no residual cells were found in the duodenal wall, which suggested that a pathological complete response has been achieved.

DISCUSSION

FGFR2 fusions have been identified as a novel oncogenic target for drug development

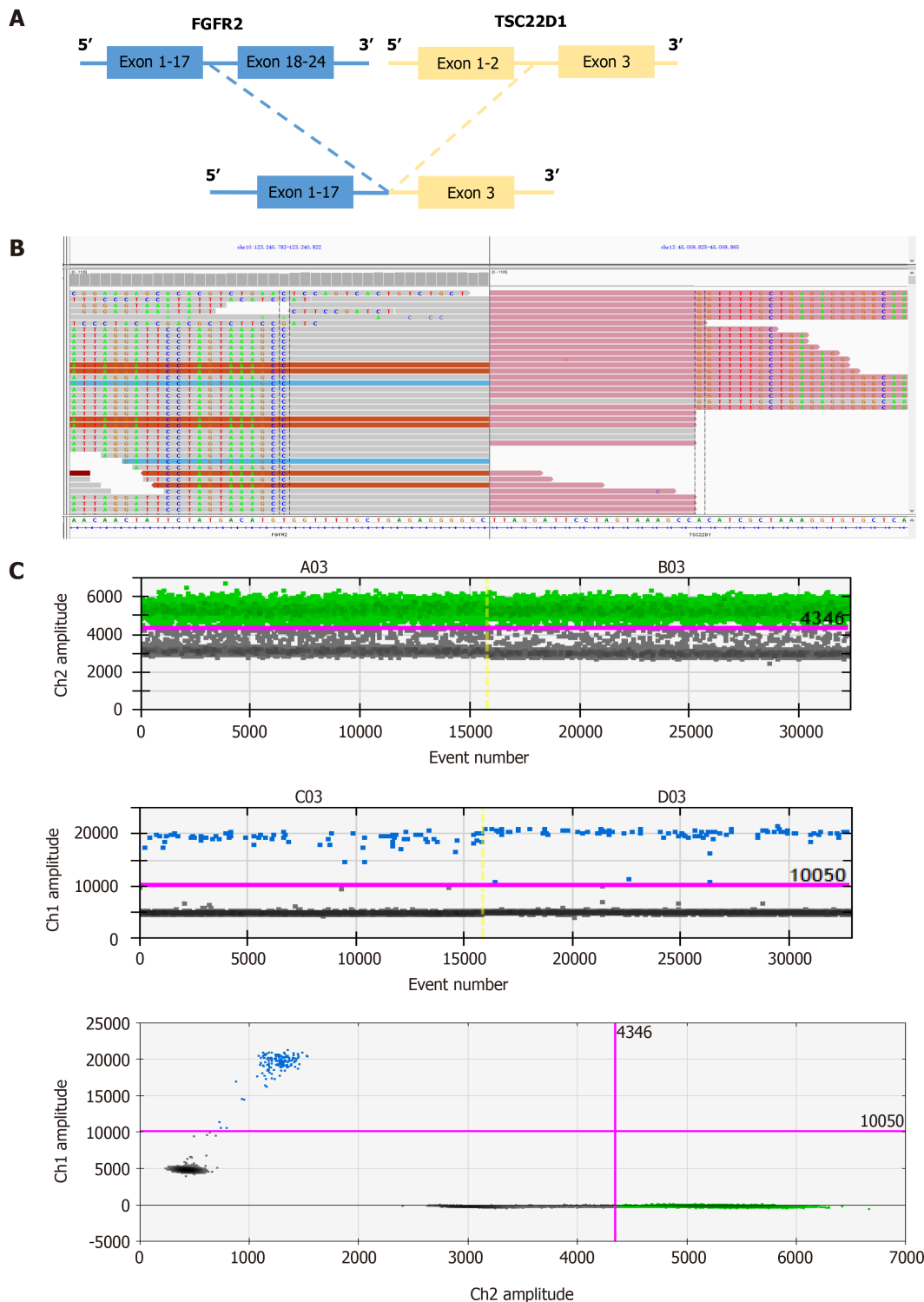


Figure 2 Next-generation sequencing and droplet digital polymerase chain reaction findings for the primary tissue sample. A: A novel intergenic region between *FGFR2* exons 1-17 and *TSC22D1* exon 3 was identified; B: Next-generation sequencing results showing the breakpoint of the *FGFR2*-*TSC22D1* fusion; C: Droplet digital polymerase chain reaction (ddPCR) amplification charts. Ch1 is FAM Channel (mutant type) and Ch2 is VIC channel (wild type). In these charts, black points represent PCR negative droplets, and blue and green points represent PCR positive droplets in FAM channel and VIC channel, respectively.

in a number of cancers including breast cancer[10] and intrahepatic cholangiocarcinoma[7-9]. Interestingly, a novel *FGFR2* gene fusion was identified in the CRC patient reported in this paper, suggesting that this event may represent a new candidate therapeutic target for which similar strategies could be used in the clinical management.

A comprehensive understanding of *FGFR2* fusion information seems to be necessary. NGS could be used as a supplementary method for *FGFR2* variation for

high-throughput molecular analysis, while detecting gene copy number alterations, fusions, insertions, and deletions simultaneously.

CONCLUSION

In our case, a rare *FGFR2* fusion gene, confirmed by ddPCR, was found, which enriched the *FGFR2* fusion spectrum. *FGFR2* inhibitors might be effective in the later treatment for this patient.

REFERENCES

- 1 **Dekker E**, Tanis PJ, Vleugels JLA, Kasi PM, Wallace MB. Colorectal cancer. *Lancet* 2019; **394**: 1467-1480 [PMID: [31631858](#) DOI: [10.1016/S0140-6736\(19\)32319-0](#)]
- 2 **Feng RM**, Zong YN, Cao SM, Xu RH. Current cancer situation in China: good or bad news from the 2018 Global Cancer Statistics? *Cancer Commun (Lond)* 2019; **39**: 22 [PMID: [31030667](#) DOI: [10.1186/s40880-019-0368-6](#)]
- 3 **Heinemann V**, von Weikersthal LF, Decker T, Kiani A, Vehling-Kaiser U, Al-Batran SE, Heintges T, Lerchenmüller C, Kahl C, Seipelt G, Kullmann F, Stauch M, Scheithauer W, Hielscher J, Scholz M, Müller S, Link H, Niederle N, Rost A, Höffkes HG, Moehler M, Lindig RU, Modest DP, Rossius L, Kirchner T, Jung A, Stintzing S. FOLFIRI plus cetuximab vs FOLFIRI plus bevacizumab as first-line treatment for patients with metastatic colorectal cancer (FIRE-3): a randomised, open-label, phase 3 trial. *Lancet Oncol* 2014; **15**: 1065-1075 [PMID: [25088940](#) DOI: [10.1016/S1470-2045\(14\)70330-4](#)]
- 4 **Van Cutsem E**, Köhne CH, Láng I, Folprecht G, Nowacki MP, Cascinu S, Shchepotin I, Maurel J, Cunningham D, Tejpar S, Schlichting M, Zubel A, Celik I, Rougier P, Ciardiello F. Cetuximab plus irinotecan, fluorouracil, and leucovorin as first-line treatment for metastatic colorectal cancer: updated analysis of overall survival according to tumor KRAS and BRAF mutation status. *J Clin Oncol* 2011; **29**: 2011-2019 [PMID: [21502544](#) DOI: [10.1200/JCO.2010.33.5091](#)]
- 5 **Loupakis F**, Cremolini C, Masi G, Lonardi S, Zagonel V, Salvatore L, Cortesi E, Tomasello G, Ronzoni M, Spadi R, Zaniboni A, Tonini G, Buonadonna A, Amoroso D, Chiara S, Carlomagno C, Boni C, Allegrini G, Boni L, Falcone A. Initial therapy with FOLFOXIRI and bevacizumab for metastatic colorectal cancer. *N Engl J Med* 2014; **371**: 1609-1618 [PMID: [25337750](#) DOI: [10.1056/NEJMoa1403108](#)]
- 6 **Facchinetti F**, Hollebecque A, Bahleda R, Lorient Y, Olausson KA, Massard C, Friboulet L. Facts and New Hopes on Selective FGFR Inhibitors in Solid Tumors. *Clin Cancer Res* 2020; **26**: 764-774 [PMID: [31585937](#) DOI: [10.1158/1078-0432.CCR-19-2035](#)]
- 7 **Sia D**, Losic B, Moeini A, Cabellos L, Hao K, Revill K, Bonal D, Miltiadous O, Zhang Z, Hoshida Y, Cornella H, Castillo-Martin M, Pinyol R, Kasai Y, Roayaie S, Thung SN, Fuster J, Schwartz ME, Waxman S, Cordon-Cardo C, Schadt E, Mazzaferro V, Llovet JM. Massive parallel sequencing uncovers actionable *FGFR2-PPHLN1* fusion and *ARAF* mutations in intrahepatic cholangiocarcinoma. *Nat Commun* 2015; **6**: 6087 [PMID: [25608663](#) DOI: [10.1038/ncomms7087](#)]
- 8 **Ying X**, Tu J, Wang W, Li X, Xu C, Ji J. *FGFR2-BICC1*: A Subtype Of *FGFR2* Oncogenic Fusion Variant In Cholangiocarcinoma And The Response To Sorafenib. *Onco Targets Ther* 2019; **12**: 9303-9307 [PMID: [31807010](#) DOI: [10.2147/OTT.S218796](#)]
- 9 **Wang Y**, Ding X, Wang S, Moser CD, Shaleh HM, Mohamed EA, Chaiteerakij R, Allotey LK, Chen G, Miyabe K, McNulty MS, Ndzengue A, Barr Fritcher EG, Knudson RA, Greipp PT, Clark KJ, Torbenson MS, Kipp BR, Zhou J, Barrett MT, Gustafson MP, Alberts SR, Borad MJ, Roberts LR. Antitumor effect of FGFR inhibitors on a novel cholangiocarcinoma patient derived xenograft mouse model endogenously expressing an *FGFR2-CCDC6* fusion protein. *Cancer Lett* 2016; **380**: 163-173 [PMID: [27216979](#) DOI: [10.1016/j.canlet.2016.05.017](#)]
- 10 **Wu YM**, Su F, Kalyana-Sundaram S, Khazanov N, Ateeq B, Cao X, Lonigro RJ, Vats P, Wang R, Lin SF, Cheng AJ, Kunju LP, Siddiqui J, Tomlins SA, Wyngaard P, Sadi S, Roychowdhury S, Hussain MH, Feng FY, Zalupski MM, Talpaz M, Pienta KJ, Rhodes DR, Robinson DR, Chinnaiyan AM. Identification of targetable FGFR gene fusions in diverse cancers. *Cancer Discov* 2013; **3**: 636-647 [PMID: [23558953](#) DOI: [10.1158/2159-8290.CD-13-0050](#)]



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

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

<https://www.wjgnet.com>

