CASE REPORT – OPEN ACCESS

International Journal of Surgery Case Reports 37 (2017) 17–21

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Extragastrointestinal stromal tumour of the lesser omentum: A case report and literature review

I.E. Katsoulis*, A. Tzortzopoulou, P. Tziakou, N. Arnogiannaki, I. Kostoglou-Athanassiou, G. Lypas, I.G. Karaitianos

St. Savvas Cancer Hospital, Athens, Greece

ARTICLE INFO

Article history:
Received 29 January 2017
Received in revised form 28 May 2017
Accepted 29 May 2017
Available online 8 June 2017

Keywords:
Extragastrointestinal stromal tumour
Lesser omentum
Abdominal mass
Case report

ABSTRACT

INTRODUCTION: Extragastrointestinal stromal tumours (EGISTs) are very uncommon compared to their gastrointestinal counterparts. Most of them originate from the intestinal mesentery and the omentum.
CASE REPORT: A 70 year-old Caucasian woman presented with a bulky abdominal mass which on laparotomy was found to originate from the lesser omentum and was completely resected. Histological examination revealed spindle cells with severe pleomorphism and high mitotic activity. Immunohistochemically, the tumour cells showed strong positivity for c-kit (CD117), DOG-1 and human haematopoietic progenitor cell antigen (CD34). An exon 11 deleterious mutation was identified and thus regular dosing of 400 mg imatinib mesylate was initiated.
DISCUSSION: There have been only a few previous reports of EGISTs arising in the lesser omentum. Although EGISTs seem to have morphological and immunohistochemical similarities with GISTs, their pathogenesis, incidence, genetic background and prognosis are not completely known because they are extremely rare. It is strongly believed that such tumours originate from cells, which have similar pathological characteristics and biological behaviour as the intestinal cells of Cajal. In most series of EGISTs, a female predominance, a greater size and a higher mitotic index than GISTs were observed.
CONCLUSION: EGISTs are very rare mesenchymal tumours which originate from cells outside the gastrointestinal tract and tend to have a more aggressive biological behaviour than their GI counterparts. Complete surgical resection is the most effective treatment associated with the use of imatinib in the presence of adverse prognostic factors. In any case a strict follow-up is necessary due to high recurrence rates.

1. Introduction

Gastrointestinal stromal tumours (GISTs) represent a distinct pathological entity that has been recognised since the discovery of c-kit (CD117) in 1998 [1]. GISTs are nonepithelial, mesenchymal tumours, which may occur in all sites of the gastrointestinal (GI) tract, but most commonly affect the stomach and the small intestine. They constitute 1–2% of all GI neoplasms and they arise from the intestinal pace-maker cells of Cajal or their stem cell precursors as a result of oncogenic mutation in the KIT tyrosine kinase [2].

GISTs are rarely found as primary tumours in extragastrointestinal tissues. Extragastrointestinal stromal tumours (EGISTs) are very uncommon compared to their gastrointestinal counterparts and typically are not connected to the walls or serosal surfaces of gastrointestinal tubular organs. Most of them originate from the intestinal mesentery and the omentum but there have been sporadic reports of EGISTs in other sites such as retroperitoneum, liver, hepatobiliary tree, pancreas, spleen, uterus, vagina, inguinal hernia sac, rectovaginal septum, ovary, pleura, pericardium, prostate, urinary bladder, scrotum, seminal vesicles and abdominal wall [3–35]. Although EGISTs seem to have morphological and immunohistochemical similarities with GISTs, their pathogenesis, incidence, genetic background and prognosis are not completely known because they are extremely rare [6].

We report the interesting case of an EGIST located in the lesser sac and review the relevant literature.

2. Case presentation

A 70 year-old Caucasian woman presented to our department with symptoms of early satiety and epigastric fullness. Physical examination revealed a mass in the left upper abdominal quadrant. The results of laboratory tests including complete blood count, amylase, liver function tests, and all tumour markers were within normal range.

* Corresponding author. Department of Surgical Oncology, St Savvas Cancer Hospital, 171 Alexandra's Avenue, GR 11522, Athens, Greece.
E-mail address: hrkats@yahoo.co.uk (I.E. Katsoulis).

http://dx.doi.org/10.1016/j.ijscr.2017.05.040

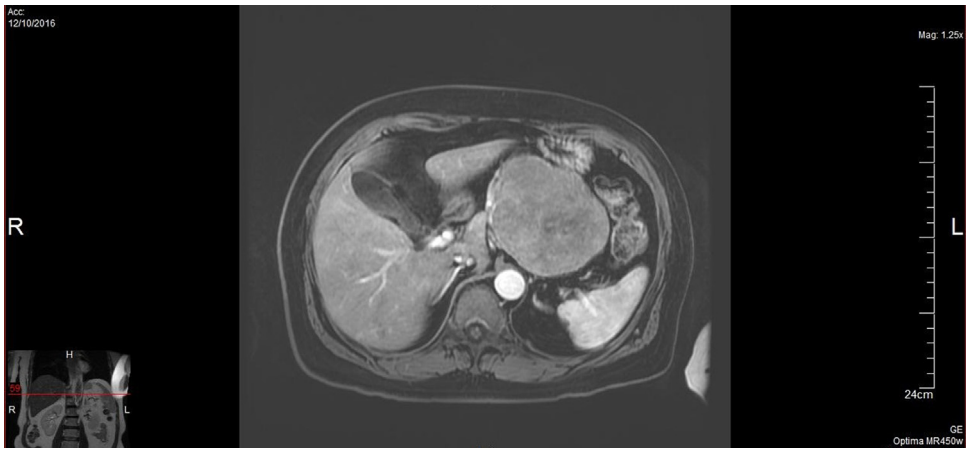

Fig. 1. MRI abdominal scan showing a large solid mass between the left hepatic lobe, the stomach and the retroperitoneum.

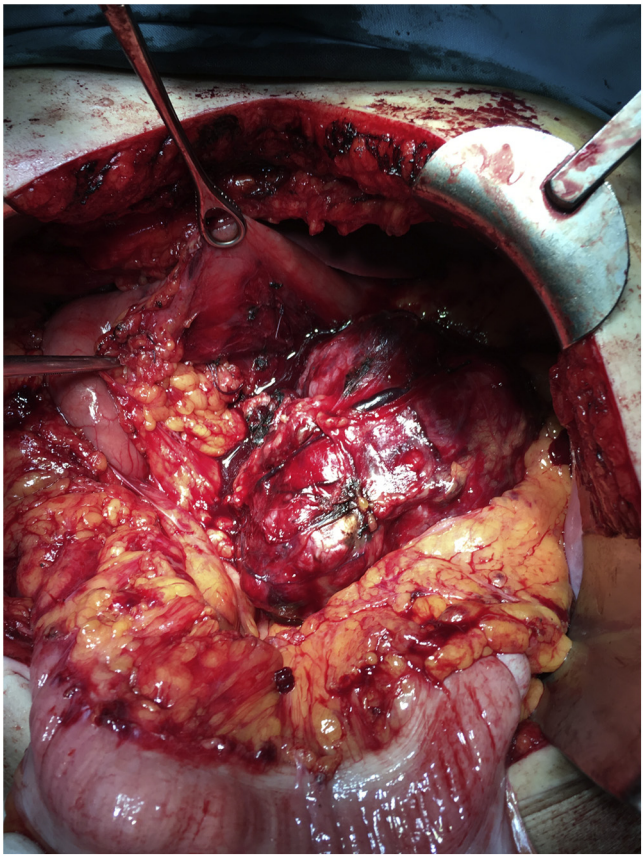

Fig. 2. Intraoperative exposure of lesser sac containing the tumour.

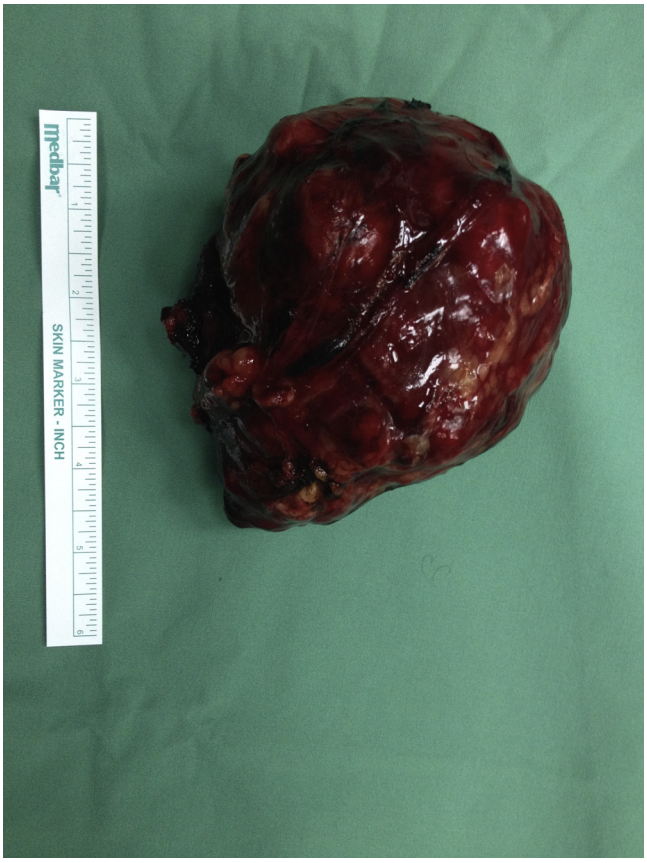

Fig. 3. The specimen measured approximately 5 inches (equal to 12.7 centimetres).

A computed tomography scan (CT scan) and a magnetic resonance imaging (MRI) of her abdomen both showed a large mass (maximum diameter 12 cms) that was confined between the left hepatic lobe, the stomach and the retroperitoneum (Fig. 1). An endoscopic ultrasound guided fine-needle aspiration was performed and cytology was consistent with a stromal tumour.

On exploratory laparotomy, after entering the lesser sac a large solid tumour was found located posterior to the gastric wall and anterior to the pancreas (Fig. 2). There was a clear plane of dissection without invasion of either organ and a complete resection of the mass was performed with safety (Fig. 3). It was assumed that the tumour originated from tissues of the lesser omentum. Neither metastatic liver lesions nor lymphadenopathy were observed. The postoperative course was uneventful and the patient was discharged after 6 days.

Histological examination revealed spindle cells with severe pleomorphism (Fig. 4) and high mitotic activity (mitotic count of 8 mitoses/50 high-power fields). Immunohistochemically, the tumour cells showed strong positivity for c-kit (CD117) (Fig. 5), DOG-1 and human haematopoietic progenitor cell antigen (CD34). Immunostains for desmin and smooth muscle actin (SMA) were negative. The expression of Ki67 protein was 5%. Considering tumour's size, its morphology and high mitotic index, the estimated risk of recurrence after surgery was high and subsequently the patient was referred to a medical oncologist for further management. Molecular analysis of c-kit (exons 9,11,13,14, 15, 16, 17)

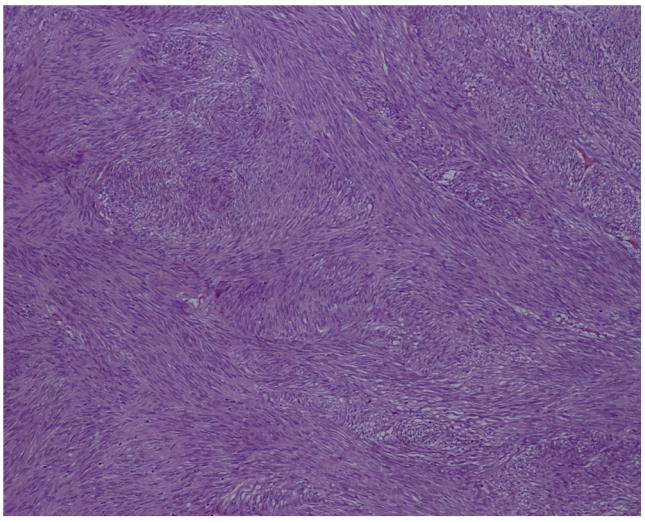

Fig. 4. Haematoxylin – eosin staining showing spindle cells with severe pleomorphism (magnification ×10).

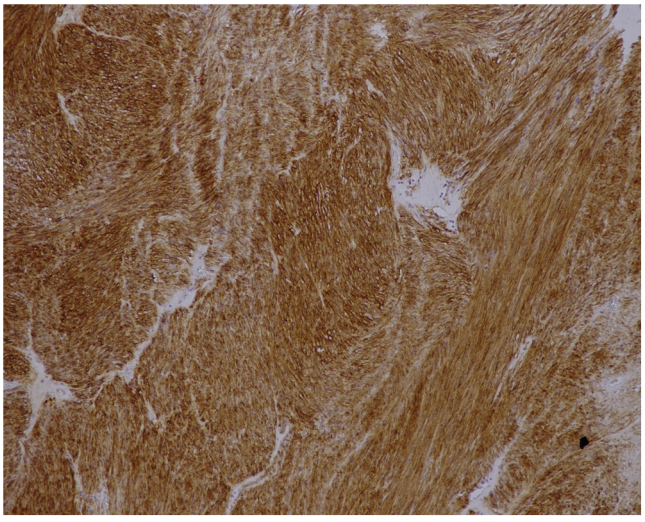

Fig. 5. Immunohistochemical staining was positive for CD117 (magnification ×10).

and PGDFR genes (exons 10, 12, 14&18) was performed. An exon 11 deleterious mutation was identified and thus regular dosing of 400 mg imatinib mesylate was initiated.

3. Discussion

Miettinen et al. [3] first reported a series of omental and mesenteric stromal tumours typically positive for CD117, but it was Reith et al. who used for the first time the term extragastrointestinal tumour (EGIST) to describe neoplasms with similar morphological and immunohistochemical characteristics as GISTs, which however occurred in the soft tissue [4]. EGISTs are extremely rare neoplasms, which account for less than 5% in large series of stromal tumours. Most of them originate from the intestinal mesentery and the omentum but there have been sporadic reports of EGISTs in other sites such as retroperitoneum, liver, hepatobiliary tree, pancreas, spleen, uterus, vagina, inguinal hernia sac, rectovaginal septum, ovary, pleura, pericardium, prostate, urinary bladder, scrotum, seminal vesicles and abdominal wall [3–35].

It is strongly believed that EGISTs originate from cells, which have similar pathological characteristics and biological behaviour as the intestinal cells of Cajal. Experimental studies have detected interstitial Cajal-like cells the so-called telocytes, in pancreatic and hepatic tissue [17,31]. In most series of EGISTs, a female predominance, a greater size and a higher mitotic index than GISTs were observed. Furthermore these tumours tend to be more common in patients over the age of 50 years.

Regarding their immunohistological characteristics as well as their genetic aberrations, it seems that EGISTs are similar to GISTs. Most EGISTs express the KIT protein and some mutations in KIT gene, especially in exon 11, have been detected in patients with an EGIST. In addition, some mutations in PDGFRA gene have been identified, especially in EGISTs with negative c-kit. In a cohort of 99 Chinese patients with omental GIST, among the 27 tumours sequenced, 33% harboured a KIT mutation and 51.9% PGDFRA mutation [36]. This seems to be in contrast to the typical GISTS, in which PDGFRA is mutated in 8–10% of cases [37]. Better recurrence-free survival with adjuvant imatinib has been associated with exon 11 mutations in the ACOSOG Z9001 study. This association was described only for deletions and not for insertions or other point mutations of the exon 11, as was the case for the tumour presented here [38].

They can also express CD34, neuron-specific enolase, smooth muscle actin, desmin and S-100 protein [19]. Some of the most essential diagnostic markers, which can distinguish EGISTs from other tumours, such as sarcomas or intra-abdominal desmoid tumours, are c-kit, DOG-1 and PKC-θ [7]. Most studies have shown that the size, mitotic activity and cellularity of EGISTs are the most accurate predictors of an adverse outcome [7]. Interestingly, Reith et al. [4] and Yamamoto et al. [39] found that the size of the tumour does not have an impact on clinical outcome, although both studies confirmed the relationship of proliferation indices with survival.

Our case was a woman with an EGIST in the lesser sac. There have been only a few previous reports of such tumours arising in the lesser omentum [8–16]. The development of omental EGISTs is usually rapid without typical clinical symptoms. The most frequent clinical sign is an abdominal mass, which often is diagnosed incidentally during examinations for other medical conditions [13]. Since distant spread of the tumour has been excluded, laparotomy and complete surgical resection with clear margins is mandatory.

The tumour cells in the present case stained strongly positive for c-kit. The product of KIT proto-oncogene, KIT protein, is a transmembrane receptor with tyrosine kinase activity [40], therefore rendering treatment with a tyrosine kinase inhibitor suitable. Imatinib mesylate, a tyrosine kinase inhibitor targeting this mutated activated kinase has been applied in the treatment of EGISTs [40]. These tumours have a high tendency for recurrence and therefore imatinib mesylate is used as adjuvant treatment following surgical excision. This agent also constitutes the mainstay treatment of locally advanced or metastatic tumours [41]. Furthermore, it has been used as preoperative treatment for downstaging of invasive EGISTs followed by curable resection [42] and even a case of complete pathological response has been reported [43]. However, recommendation of systematic neoadjuvant therapy with imatinib remains investigational and more studies are warranted in the future. The present work has been reported in line with the SCARE criteria [44].

4. Conclusion

EGISTs are very rare mesenchymal tumours which have morphological and immunohistological similarities with GISTs. They originate from cells outside the gastrointestinal tract and tend to have a greater size, higher mitotic index and more aggressive biological behaviour than their GI counterparts. Complete surgical resection is the most effective treatment associated with the use

of imatinib in the presence of adverse prognostic factors. In any case a strict follow-up is necessary due to high recurrence rates.

Conflicts of interest

The authors declare that they have no competing interests.

Funding source

None.

Ethical approval

Not applicable.

Consent

An informed consent has been obtained.

Author contribution

Iraklis E. Katsoulis performed the literature review, drafted and revised the manuscript. Adelais Tzortzopoulou, Ifigeneia Kostoglou-Athanassiou and Georgios Lypas contributed in the writing of the manuscript. Paraskevi Tziakou and Niki Arnogiannaki performed the histological examination and provided the microscopic illustrations. Ioannis G. Karaitianos revised the manuscript. All authors read and approved the final manuscript.

Registration of research studies

Not Applicable.

Guarantor

Ioannis G. Karaitianos.

References

[1] S. Hirota, K. Isozaki, Y. Moriyama, K. Hashimoto, T. Nishida, S. Ishiguro, K. Kawano, M. Hanada, A. Kurata, M. Takeda, G. Muhammad Tunio, Y. Matsuzawa, Y. Kanakura, Y. Shinomura, Y. Kitamura, Gain-of-function mutations of c-kit in human gastrointestinal stromal tumors, Science 279 (5350) (1998) 577–580 (Jan 23).

[2] J.A. Laurini, J.E. Carter, Gastrointestinal stromal tumors: a review of the literature, Arch. Pathol. Lab. Med. 134 (2010) 134–141.

[3] M. Miettinen, J.M. Monihan, M. Sarlomo-Rikala, A.J. Kovatich, N.J. Carr, T.S. Emory, L.H. Sobin, Gastrointestinal stromal tumors/smooth muscle tumors (GISTs) primary in the omentum and mesentery: clinicopathologic and immunohistochemical study of 26 cases, Am. J. Surg. Pathol. 23 (1999) 1109–1118.

[4] J.D. Reith, J.R. Goldblum, R.H. Lyles, S.W. Weiss, Extragastrointestinal (soft tissue) stromal tumors: an analysis of 48 cases with emphasis on histologic predictors of outcome, Mod. Pathol. 13 (2000) 577–585.

[5] N. Iqbal, A. Sharma, N. Iqbal, Clinicopathological and treatment analysis of 13 extragastrointestinal stromal tumors of mesentery and retroperitoneum, Ann. Gastroenterol. 28 (January-March (1)) (2015) 105–108.

[6] C. Tombatore, S. Palmucci, G. Angelico, E. Vasquez, G. Petrillo, S. Puelo, A. Di Cataldo, Extragastrointestinal stromal tumor of lesser omentum: a challenging radiological and histological diagnosis, Clin. Imaging 33 (2015) 1123–1127.

[7] K.H. Kim, S.D. Nelson, D.H. Kim, K.U. Choi, S.J. Kim, K.W. Min, K.S. Jang, S.S. Paik, Y.H. Oh, S.W. Chae, J.H. Sohn, H.J. Kim, Y.K. Cho, B.I. Kim, D.I. Park, C.I. Sohn, S. Oh, S.H. Choi, Y.J. Choi, H.Y. Woo, Y.L. Park, S.J. Park, S.H. Lee, S.D.O. Ryu, SI, G. Kang, K. Kim, Y.H. Cho, J.S. Pyo, Diagnostic relevance of overexpressions of PKC-θ and DOG-1 and KIT/PDGFRA gene mutations in extra gastrointestinal stromal tumors: a Korean six-center study of 28 cases, Anticancer Res. 32 (March) (2012) 923–937.

[8] T. Takahashi, S. Kuwano, M. Yanagihara, A. Kakita, A primary solitary tumor of the lesser omentum with immunohistochemical features of gastrointestinal stromal tumors, Am. J. Gastroenterol. 93 (1998) 2269–2273.

[9] H. Fukuda, T. Suwa, F. Kimura, et al., Gastrointestinal stromal tumor of the lesser omentum: report of a case, Surg. Today 31 (2001) 715–718.

[10] I. Nakaya, Y. Iwata, T. Abe, et al., Malignant gastrointestinal stromal tumor originating in the lesser omentum, complicated by rapidly progressive glomerulonephritis and gastric carcinoma, Intern. Med. 43 (2004) 102–105.

[11] S. Sakurai, T. Hishima, Y. Takazawa, et al., Gastrointestinal stromal tumors and KIT-positive mesenchymal cells in the omentum, Pathol. Int. 51 (2001) 524–531.

[12] G. Dedemadi, G. Georgoulis, D. Kontopanos, E. Anagnostou, G. Morphopoulos, J.F. Emile, C. Christopoulos, Extragastrointestinal stromal tumors of the omentum: review apropos of a case with a novel gain-of-function KIT mutation, J. Gastrointest Cancer 40 (3–4) (2009) 73–78.

[13] D. Fagkrezos, Z. Touloumis, M. Giannila, C. Penlidis, K. Papaparaskeva, C. Triantopoulou, Extra-gastrointestinal stromal tumor of the omentum: a rare case report and review of the literature, Rare Tumors 4 (3) (2012) e44 (Jun 26).

[14] H. Behammane, M. Oussaid, S. Ait Laalim, I. Imane Toughrai, K. Ibn majdoub, K. Khalid Mazaz, Stromal tumor of the lesser omentum: a case report, Pan Afr. Med. J. 17 (2014) 236.

[15] I.K. Skandalos, N.F. Hotzoglou, K.C. Matsi, X.A. Pitta, A.I. Akmas, Giant extragastrointestinal stromal tumor of the lesser omentum obscuring the diagnosis as a choloperitoneum, Int. J. Surg. Case Rep. 4 (10) (2013) 818–821.

[16] H. Ogawa, K. Gotoh, T. Yamada, H. Takahashi, H. Ohigashi, S. Nagata, Y. Tomita, M. Yano, O. Ishikawa, A case of KIT-negative extra-gastrointestinal stromal tumor of the lesser omentum, Case Rep. Gastroenterol. 6 (May (2)) (2012) 375–380.

[17] S. Padhi, R. Sarangi, S. Mallick, Pancreatic extragastrointestinal stromal tumors, interstitial Cajal like cells and telocytes, JOP 14 (2013) 1–14.

[18] S. Akbulut, R. Yavuz, E. Otan, S. Hatipoglu, Pancreatic extragastrointestinal stromal tumor: a case report and comprehensive literature review, Word J. Gastrointest Surg. 6 (9) (2014) 175–182 (27).

[19] N.A. Arabi, A.M. Musaad, E.E. Ahmed, A.A. Abdo, A.M. Elhassan, H. Hassan, N. Adam, M. Abdelazeem, M.A. Ibnouf, Primary extragastrointestinal stromal tumour of the whole abdominal cavity, omentum, peritoneum and mesentery: a case report and review of the literature, J. Med. Case Rep. 8 (2014) 337 (Oct 10).

[20] M. Castillo-Sang, S. Mancho, A.W. Tsang, B. Gociman, B. Almaroof, M.Y. Ahmed, A malignant omental extra-gastrointestinal stromal tumor on a young man: a case report and review of the literature, World J. Surg. Oncol. 6 (2008) 50.

[21] W. Li, Y. Cui, G. Ren, J. Wang, X. Wu, Extragastrointestinal stromal tumor of the mesoappendix: CT findings and a review of the literature, World J. Surg. Oncol. 10 (2012) 211.

[22] Y.N. Gao, G.Q. Jiang, J.X. Liu, W.S. Tang, L.Z. Chen, Preoperational misdiagnosis of extragastrointestinal stromal tumors as ovarian cancer: report of three cases with literature review, Zhonghua Fu Chan Ke Za Zhi 40 (2005) 339–341 (In Chinese).

[23] W. Zhang, Z. Peng, L. Xu, Extragastrointestinal stromal tumor arising in the rectovaginal septum: report of an unusual case with literature review, Gynecol. Oncol. 113 (2009) 399–401.

[24] A. Mekni, I. Chelly, H. Azzouz, I. Ben Ghorbel, S. Bellil, S. Haouet, N. Kchir, M. Zitouna, K. Bellil, Extragastrointestinal stromal tumor of the urinary wall bladder: case report and review of the literature, Pathologica 100 (2008) 173–175.

[25] L. Alkhatib, O. Albtoush, N. Bataineh, K. Gharaibeh, I. Matalka, Y. Tokuda, Extragastrointestinal stromal tumor (EGIST) in the abdominal wall: case report and literature review, Int. J. Surg. Case Rep. 2 (2011) 253–255.

[26] W. Song, J.R. Yang, Y.H. Wang, Q.C. Liang, Primary extragastrointestinal stromal tumor of the seminal vesicles, Urology 79 (2012) e36–e37.

[27] A. Goyal, R.E. Mansel, S. Goyal, Gastrointestinal stromal tumour in an inguinal hernial sac: an unusual presentation, Postgrad. Med. J. 79 (2003) 707–708.

[28] A. Barros, E. Linhares, M. Valadão, R. Gonçalves, B. Vilhena, C. Gil, C. Ramos, Extragastrointestinal stromal tumors (EGIST): a series of case reports, Hepatogastroenterology 58 (May-June (107–108)) (2011) 865–868.

[29] Z.H. Zhang, G.W. Feng, Z.F. Liu, L. Qiao, T. Zhang, C. Gao, Y. Xu, A young man with primary prostatic extra-gastrointestinal stromal tumor: a rare case report and review of the literature, Int J Clin Exp Pathol 7 (4) (2014) 1764–1770 (Mar 15).

[30] A.R. Louis, S. Singh, S.K. Gupta, A. Sharma, Primary GIST of the liver masquerading as primary intra-abdominal tumour: a rare extra-gastrointestinal stromal tumour (EGIST) of the liver, J Gastrointest Cancer 45 (September (3)) (2014) 392–394.

[31] S. Padhi, H.K. Nayak, Primary extragastrointestinal stromal tumours in the hepatobiliary tree and telocytes, Adv. Exp. Med. Biol. 913 (2016) 207–228.

[32] C.Q. Zhang, D.G. Lu, Q.F. Liu, W. Xiao, Primary extragastrointestinal stromal tumor of the pleura: a case report, Oncol. Lett. 11 (May) (2016) 3135–3138.

[33] Q.Y. Liu, Y.Z. Kan, M.Y. Zhang, T.Y. Sun, L.F. Kong, Primary extragastrointestinal stromal tumor arising in the vaginal wall: significant clinicopathological characteristics of a rare aggressive soft tissue neoplasm, World J. Clin. Cases 4 (4) (2016) 118–123 (Apr 16).

[34] T. Arpaci, F. Tokat, R.B. Arpaci, T. Akbas, G. Ugurluer, S. Yavuz, Primary pericardial extragastrointestinal stromal tumor: a case report and literature review, Oncol. Lett. 9 (June (6)) (2015) 2726–2728.

[35] T. Oge, D. Arik, E. Uysal, O.T. Yalçin, S. Kabukcuoglu, S. Ozalp, Uterine extra gastrointestinal stromal tumor presenting as intramural leiomyoma, Eur. J. Gynaecol. Oncol. 36 (2015) 231–233.

[36] F. Feng, Y. Tian, Z. Liu, S. Liu, G. Xu, M. Guo, X. Lian, 1 Fan D, Hongwei Zhang Clinicopathological features and prognosis of omental gastrointestinal stromal tumor: evaluation of a pooled case series, Sci. Rep. 6 (2016) 30748.

[37] M.C. Heinrich, C.L. Corless, A. Duensing, L. McGreevey, C.J. Chen, N. Joseph, S. Singer, D.J. Griffith, A. Haley, A. Town, G.D. Demetri, C.D. Fletcher, J.A. Fletcher, PDGFRA activating mutations in gastrointestinal stromal tumors, Science 299 (5607) (2003) 708–710 (Jan 31).
[38] C.L. Corless, K.V. Ballman, C.R. Antonescu, V. Kolesnikova, R.G. Maki, P.W.T. Pisters, M.E. Blackstein, C.D. Blanke, G.D. Demetri, M.C. Heinrich, M. von Mehren, S. Patel, M.D. McCarter, K. Owzar, R.P. DeMatteo, Pathologic and molecular features correlate with long-Term outcome after adjuvant therapy of resected primary GI stromal tumor: the ACOSOG Z9001 trial, J. Clin. Oncol. 32 (15) (2014) 1563–1570.
[39] H. Yamamoto, Y. Oda, K. Kawaguchi, N. Nakamura, T. Takahira, S. Tamiya, T. Saito, Y. Oshiro, M. Ohta, T. Yao, Tsuneyoshi M. c-kit and PDGFRA mutations in extragastrointestinal stromal tumor (gastrointestinal stromal tumor of the soft tissue), Am. J. Surg. Pathol. 28 (2004) 479–488.
[40] E. Curtit, L. Mansi, E. Viel, E. Dobi, L. Chaigneau, T. Nguyen, X. Pivot, J.Y. Blay, E. Kalbacher, KIT and KIT: from biology to clinical use, Bull. Cancer 99 (2012) 191–197.
[41] J.Y. Blay, A. Le Cesne, I. Ray Coquard, B. Bui, F. Duffaud, C. Delbaldo, A. Adenis, P. Viens, M. Rios, E. Bompas, D. Cupissol, C. Guillemet, P. Kerbrat, J. Fayette, S. Chabaud, P. Berthaud, D. Perol, Prospective multicentric randomized phase III study of imatinib in patients with advanced gastrointestinal stromal tumors comparing interruption versus continuation of treatment beyond 1 year: the French Sarcoma Group, J. Clin. Oncol. 25 (2007) 1107–1113.
[42] M. Muto, M. Fujiya, T. Okada, M. Inoue, H. Yabuki, Y. Kohgo, An invasive extragastrointestinal stromal tumor curably resected following imatinib treatment, J. Gastrointestin. Liver Dis. 22 (September) (2013) 329–332.
[43] N. Quezada, F. Acevedo, A. Marambio, F. León, H. Galindo, J.C. Roa, N. Jarufe, Complete pathological response to imatinib mesylate in an extraintestinal gastrointestinal stromal tumor, Int J Surg Case Rep 5 (2014) 681–685.
[44] R.A. Agha, A.J. Fowler, A. Saetta, I. Barai, S. Rajmohan, D.P. Orgill, the SCARE Group, The SCARE statement: consensus-based surgical case report guidelines, Int. J. Surg. 34 (2016) 180–186.