CASE REPORT

Gastric mucinous myxoma: A case report

Tadashi Terada*

Department of Pathology, Shizuoka City Shimizu Hospital, Shizuoka, Japan

Received: December 29, 2015 **Accepted:** March 6, 2016 **Online Published:** March 24, 2016
DOI: 10.5430/crcp.v3n3p11 **URL:** http://dx.doi.org/10.5430/crcp.v3n3p11

ABSTRACT

Gastric mucinous myxoma (GMM), the author's tentative terminology, has not been reported. The author reports the first case of GMM, a type of myxoma composed mainly of mucins. A 60-year-old man presented gastric discomfort, and received upper gastrointestinal endoscopy, which revealed a raised submucosal tumor (21 mm × 18 mm × 6 mm). He was treated by endoscopic submucosal dissection with a clinical diagnosis of GIST. Microscopically, the lesion was a GMM with well demarcation from surroundings but without capsule. In the periphery of the lesion, there were hyperplastic foveolar glands (HFG) containing much mucus. No epithelial elements were noted in GMM. There were many foci of gradual transitions between GMM and HFG, as if the HFG secrete mucins into the GMM. Histochemically, the GMM and HFG were positive for acidic mucins and neutral mucins. Immunohistochmeical results of the GMM were as follows: CK7-, CK20-, p53-, Ki67 1%, alpha-smooth muscle actin (ASMA)-, desmin-, MUC1-, MUC2-, MUC5AC+, and MUC6+. Immunohistochmeical results of the HFG were as follows: CK7+, CK20+/-, p53-, Ki67 5%, ASMA-, desmin-, MUC1-, MUC2-, MUC5AC+, and MUC6+. The author speculates that the HFG develops, then causes mucous hypersecretion and mucus submucosal accumulation, and then finally creates the GMM.

Key Words: Stomach, Myxoma, Mucins, Endoscopy

1. INTRODUCTION

Most tumors of stomach are epithelial neoplasms, but mesenchymal tumors can occur in stomach, including gastrointestinal stroma tumor (GIST), leiomyoma, schwannoma, and so on.[1,2] Myxoma is a term for the definitive tumor exhibiting predominant myxoid appearances as seen, for example, in fetal umbilical cords and in cardiac myxoma, and cutaneous mixed tumor.[3] Mucins of myxomas are chemically composed of glycoproteins, such as glycoseaminoglycan, proteoglycans, and MUC proteins conjugated with sugar residues.[4,5] In contrast, myxoid changes can be present in a variety of tumors (myxoid tumors). These myxoid tissues in myxoid tumors are seen only in some areas of tumors in contrary to pure myxoma which shows exclusive myxoid changes. These myxoid tumors include malignant mesenchymal tumors such as malignant fibrous histiocytoma, myxofibrosarcoma, malignant fbromyxoid tumor, osteosarcoma, chondrosarcoma, and myxoid chondrosarcoma, and benign tumors such as myxoid fibroblastic tumor, and nerve sheath myxoma. In the stomach, several reports have shown the presence of a myxoid tumor known as plexiform angiomyxoid myofibroblastic tumors (PAMT),[6–9] but gastric mucinous myxoma (GMM) has not been reported to the best of the author's knowledge. GMM in this article is a new term proposed herein by the author for the gastric pure myxomatous tumor composed of mucins and having hyperplastic foveolar glands (HFG) in the periphery, The author herein reports the first case of GMM, which seemed to have arisen in gastric HFG or gastric hyperplastic polyp (GHP).

*Correspondence: Tadashi Terada; Email: piyo0111jp@yahoo.co.jp; Address: Department of Pathology, Shizuoka City Shimizu Hospital, Shizuoka, Japan.

2. Case report

A 70-year-old man complained of epigastric discomfort and consulted our hospital. The patient showed mild hypertension (145/95 mmHg) and mild diabetic state (HgA1C 6.7%). No findings of pernicious anemia were found. He stated that he had been healthy until the consultation and he received no medical drugs. He denied previous gastric disorders. He underwent upper-gastrointestinal endoscopy (GIE), which identified a raised tumor (21 mm × 18 mm, and height of circa 6 mm) in the greater curvature of the gastric fundus (see Figure 1). The tumor appeared to be submucosal in location and showed a small central umbilicus. The patient was treated by endoscopic submucosal dissection (ESD). The ESD specimen was continuously cut into 8 pieces, conventionally processed, embedded in paraffin, and subjected to hematoxylin and eosin (HE) staining, to mucins stainings[10] including d-PAS, alcian blue at pH2.5 and 1.0, colloidal iron, and mucicarmine, as well as to immunohistochemistry (IHC) that employed Envision method.[11,12] Urease and culture test of the ESD specimen suggested a presence of Helicobacter Pylori, and Giemsa stain of the tissue detected Helicobacter Pylori.

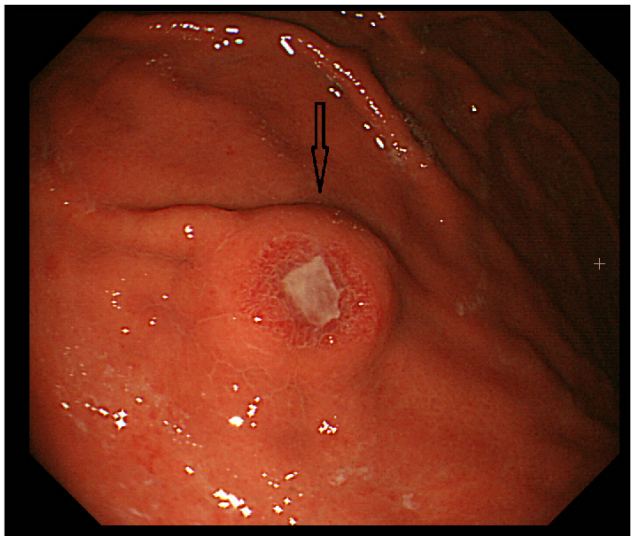

Figure 1. Gastric endoscopy reveals a raised submucosal tumor (arrow) with umbilicus at the tip in gastric large curvature. The features obviously suggest a submucosal gastric tumor. The clinical diagnosis was a submucosal tumor suspicious of GIST.

Microscopically, the tumor was well defined from the surroundings (see Figure 2A). The umbilicus seen in GIE represented a shallow ulcer. The tumor involved largely the submucosa and to a lessor degree the mucosa, as if the tumor would have involved from the mucosa to submucosa. The tumor was composed of hypocellular myxoid tissue poor in collagens and elastic fibers. However, small capillaries with very thin stroma were scattered (see Figure 2B). The capillaries never formed plexiform vessels. The myxoid areas resembled mucinous tissue rather than myxoid tissue of matrices seen in mesenchymal tissues or pure myxoma. There were HFG containing much mucus in the periphery of the myxoid tumor (see Figure 2C). There were numerous areas where the mucinous tumor and HFG showed mutual merges, as if the gastric myxomatous tumor might have arisen from HFG. No epithelial elements were noted in myxoid tumor that was confirmed by immunohistochmeical stainings using cytokeratin (CK)-CAM5.2, CK-AE1/AE3, and CK7. Histochmeical study disclosed that a large amount of neutral mucins, sialomucins and sulfomucins were present in the myxoid tumor and also in the HFG (see Figure 2D). IHC results of the myxoid tumor were as follows: CK-AE1/AE3, CK-CAM5.2, CK7-, CK20-, p53-, Ki67 1%, alpha-smooth muscle actin (ASMA)-, desmin-, S100-, KIT-, CD34-, MUC1-, MUC2-, MUC5AC+ (mild), MUC6+. IHC results of HFG were as follows: CK7+, CK20+/-, p53-, Ki67 5%, ASMA-, desmin-, S100-, KIT-, CD34-. MUC1-, MUC2-, MUC5AC+ (see Figure 2E), and MUC6+ (see Figure 2F). The patient is now well without disease, and receive short-time follow-up using GIE.

3. Discussion

The majority of myxomatous tumors in stomach is PAMT; only several cases of this tumor have been reported in the literature.[6–9] The gastric PAMT is characterized by myxoid appearances with plexiform angiomatous, fibroblastic proliferation, as well as by positive IHC for ASMA and desmin. The present tumor was a homogenous mucinous myxomatous tumor having few collagens, and the tumor was immunohistochemically negative for ASMA and desmin, markers for smooth muscle phenotype. In addition, the current tumor showed intra-tumoral capillaries but no plexiform features as seen in PAMT were seen in them; thus the present tumor is not PAMT. The present tumor is quite different from carcinoid, an epithelial neuroendocrine tumor relatively frequently seen in the stomach as a submucosal tumor. The current tumor is not GIST, a tumor which can assume a submucosal tumor with umbilicus, because of negative IHC for KIT and CD34. The present tumor is apparently not leiomyoma and Schwannoma, both of which can take forms of gastric submucosal tumors, because the current tumor was negative IHC for S100, desmin, ASMA.[13]

The histogenesis of the present myxomatous tumor is not very clear. The author speculates the following histogenetic and pathogenetic sequences: stimuli in stomach cause the development of HFG, then the HFG secrete much mucus

ISSN 2331-2726 E-ISSN 2331-2734

mainly in the submucosal areas. Then mucins accumulate in the submucosa and mucosa, and then a tumor formation by mucins follows. Next, organization (capillaries) develops, and finally give rise to the formation of the myxomatous gastric submucosal tumor (the author tentative termed this lesion as GMM in this article) surrounded by HFG.[14, 15] This situation is seen in relatively more common, but absolutely rare "mucous impaction" in bronchi. It is very plausible that if the mucin hypersecretion by HFG would be exophytic, then the outcome could be a formation of gastric hyperplastic polyp. If the mucous hypersecretion was toward submucosa, then it leaded to the formation mucinous myxomatous tumor like the present case. Frequent findings in the present tumor that the HFG seemingly ruptured into the myxoid tissue strongly support this hypothesis. The mucous characteristics of the present tumor are rigidly confirmed by positive mucins and gastric type MUCs (MUC5AC and MUC6). In addition, the similarity of IHC findings between FHG and the present tumor suggests the above hypothesis.

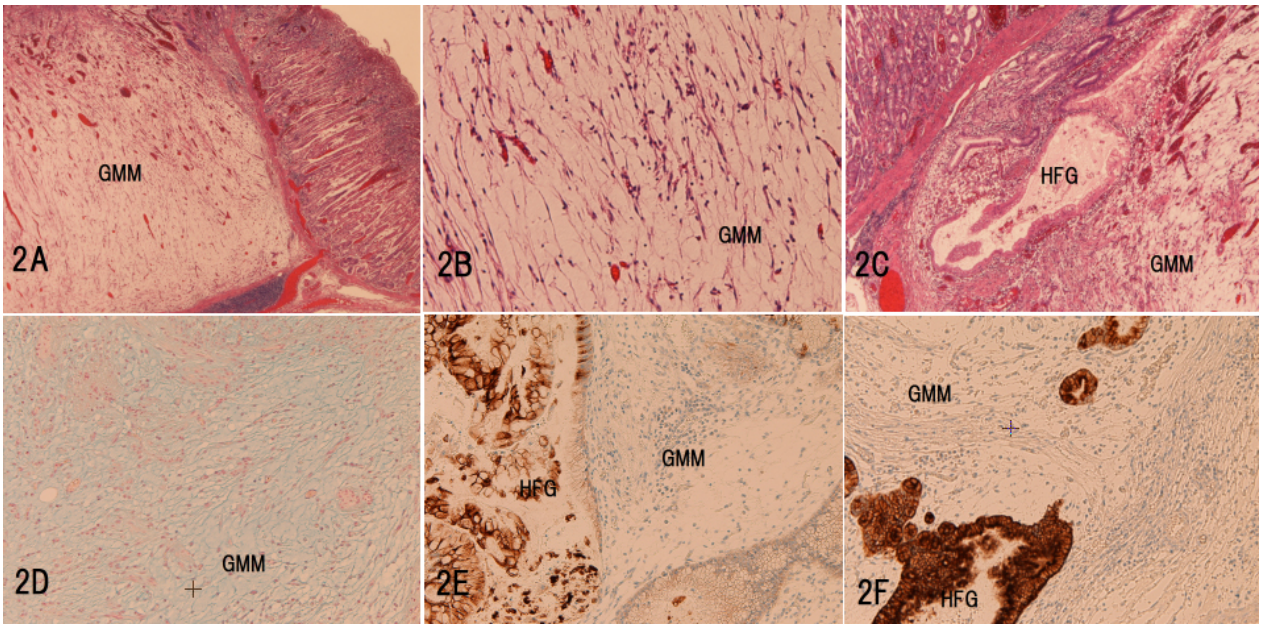

Figure 2. Histological (A-D) and Immunohistochemical (IHC) (E,F) features of the gastric tumor

A: Low power view shows myxoid tumor (indicated by GMM) in the submucosa. HE, ×40; B: Higher magnification of the myxoid tumor (indicated by MGG) show mucinous characteristics, little collagens, and capillaries; C: A small number of hyperplastic foveolar glands (HFG) are seen in the periphery of the gastric myxomatous submucosal tumor (labeled as GMM). HE, ×20; D: Alcian blue pH2.5 stain shows abundant mucins both in the gastric myxomatous tumor (indicated by GMM) and in the HFG. ×200; E: Immunohistochemistry (IHC) for MUC5AC show mild expression in GMM and high expression in FHG. IHC for MUC5AC. ×200; F: IHC for MUC6 show mild expression in GMM and high expression in FHG. IHC for MUC6. ×200.

The present GMM is interesting in the aspect of GIE, which showed a submucosal tumor with an umbilicus on the tip. The clinical diagnosis was GIST. The histopathologic study revealed that the gastric submucosal tumor was an accumulation of mucins (GMM). The umbilicus seen in GIE was due to a shallow ulcer. Therefore, the author thinks that endoscopic gastroenterologists and pathologists are encouraged to know the presence of GMM.

GMM must be differentiated both endoscopically and pathologically from other submucosal lesions such as GIST, Schwannoma, leiomyoma, solitary fibrous tumor (SFT), carcinoids, mucinous carcinoma, signet-ring cell carcinoma, and other rare conditions. No epithelial elements were seen in the present GMM morphologically and by IHC for CK, indicating that the GMM is not mucinous carcinoma or signet-ring carcinoma. Possibility of carcinoid can be eliminated for similar reason, though the present study did not perform IHC for endocrine cells. The present case is not GIST, Schwannoma, leiomyoma or SFT immunohistochemically; all these tumors can focally show myxomatous changes.

Immunohistochemically, the GMM area was positive for MUC5AC and MUC6, both of gastric-type mucin, indicate the gastric phenotype and presence of mucins rather than matrix secreted by mesenchymal cells. The absence of MUC1 (non-secretory mucin) and MUC2 (goblet cell phenotype) discloses that the GMM does not show colonic mucinous

phenotype. The pattern of CK7+/CK12+ of the GMM indicates both gastric and colonic CK phenotype. Other IHC interpretation is not shown.

4. Conclusions

The first case of GMM was reported. With regards to histogenesis and pathogenesis of the GMM, the author speculates the following scenario: (1) HFG develops with similar histogenetic mechanism to GHP. (2) The HFG causes mucous hypersecretion into downward submucosa. (3) The mucous hypersecretion finally creates the features of the GMM. The author hope to create the term GMM for this peculiar lesion, because the GMM had clear-cut clinicopathologic features. It must be stressed that GMM must be differentiated from GIST and mucinous carcinoma endoscopically and histopathologically. The establishment of the disease entity of GMM await further studies using many cases.

Conflicts of Interest Disclosure

The author has no conflict of interest.

References

[1] Terada T. Histopathologic study using computer data base of the stomach in 10,000 consecutive gastric specimens: (1) Benign conditions. Gastroenterol Rep. 2015; 3: 238-42. PMid: 25688102. http://dx.doi.org/10.1093/gastro/gou093

[2] Terada T. Histopathological study using computer database of 10,000 consecutive gastric specimens: (2) malignant lesions. Gastroenterol Rep. (in press) http://dx.doi.org/10.1093/gastro/gou094

[3] Terada T. Pseudomyxoma cutis: a new entity. Int J Clin Exp Pathol. 2013; 6: 1169-76. PMid: 23696938.

[4] Terada T. Human fetal ductal plate revisited: II. MUC1, MUC5AC, and MUC6 are expressed in human fetal ductal plate and MUC1 is expressed also in remodeling ductal plate, remodeled ductal plate and mature bile ducts of human fetal livers. Int J Clin Exp Pathol. 2013; 6: 571-85. PMid: 23573304.

[5] Terada T. Development of extrahepatic bile duct excluding gall bladder in human fetuses: histological, histochemical, and immunohistochemical analysis. Microsc Res Tech. 2014; 77: 832-40. PMid: 25091784. http://dx.doi.org/10.1002/jemt.22406

[6] Takahashi Y, Shimizu S, Ishida T, *et al*. Plexiform angiomyxoid myofibroblastic tumor of the stomach. Am J Surg Pathol. 2007; 31: 724-8. PMid: 17460456. http://dx.doi.org/10.1097/01.pas.0000213448.54643.2f

[7] Choi HS, Chun HJ, Kim I. An unusual submucosal tumor of the stomach. Gastroenterology. 2012; 142(4): 11-2. PMid: 22370214. http://dx.doi.org/10.1053/j.gastro.2011.10.015

[8] Takahashi Y, Suzuki M, Fukusato T. Plexiform angiomyxoid myofibroblastic tumor of the stomach. World J Gastroenterol. 2010; 16: 2835-40. PMid: 20556828. http://dx.doi.org/10.3748/wjg.v16.i23.2835

[9] Wang WY, Li JN, Li GD. Plexiform angiomyxoid myofibroblastic tumour of the gastric fundus: successful diagnosis and treatment by endoscopy. J Clin Pathol. 2010; 63: 569-70. PMid: 20498030. http://dx.doi.org/10.1136/jcp.2010.076646

[10] Terada T, Nakanuma Y, Ohta G. Glandular elements around the intrahepatic bile ducts in man; their morphology and distribution in normal livers. Liver. 1987; 7: 1-8. PMid: 3553822. http://dx.doi.org/10.1111/j.1600-0676.1987.tb00308.x

[11] Terada T, Kawaguchi M. Primary clear cell adenocarcinoma of the peritoneum. Tohoku J Exp Med. 2005; 206: 271-5. PMid: 15942157. http://dx.doi.org/10.1620/tjem.206.271

[12] Terada T, Kawaguchi M, Furukawa K, *et al*. Minute mixed ductal-endocrine carcinoma of the pancreas with predominant intraductal growth. Pathol Int. 2002; 52: 740-6. PMid: 12685552. http://dx.doi.org/10.1046/j.1440-1827.2002.01416.x

[13] Terada T. Schwannoma and leiomyoma of colon in a patient with ulcerative colitis. Journal of Gastrointestinal Cancer. 2015. (in press) http://dx.doi.org/10.1007/s12029-015-9747-7

[14] Terada T. Malignant transformation of foveolar hyperplastic polyp of the stomach: a histopathological study. Med Oncol. 2011; 28: 941-4. PMid: 20458557. http://dx.doi.org/10.1007/s12032-010-9556-6

[15] Terada T. Heterotopic gastric mucosa of the gastrointestinal tract: a histopathologic study of 158 cases. Pathol Res Pract. 2011; 207: 148-50. PMid: 21242038. http://dx.doi.org/10.1016/j.prp.2010.12.004