Case Report

Useful classification of intussusception for preoperative 3D-MDCT images, type M or W: a case report and a novel classification

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\textbf{A R T I C L E   I N F O}

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\textbf{A B S T R A C T}

A 67-year old male with intussusception due to sigmoid colonic cancer was treated. For making correct classification of antegrade or retrograde type, multidetector-computed tomography in longitudinal views seemed optimal to demonstrate anatomical type. This radiological modality made to identify this instead of ultrasound sonography (US) could reveal details of surrounding information. Under intestinal obstruction due to intussusception, cancer-related information such as lymph nodal involvement could be visible using not US but MDCT because of air collection around lesions. His preoperative MDCT revealed antegrade type intussusception with cancerous mass at the leading point and no nodal involvements. Under general anesthesia, he has undertaken laparotomy to resect intussuscepted sigmoid colonic lesion successfully without delaying of surgical procedure. For correct preoperative identification of antero-retrograde type of intussusception using MDCT, safer surgical procedure could be provided. For these purposes, the authors classified these into 2 types, type M and W from longitudinal views of intussuscepted lesions using 3D-MDCT. This classification might be helpful for clinicians to diagnose type of intussusception and provide preoperative information of cancerous involvements with vessels and lymph nodal involvements to consider surgical option.

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Introduction

Intussusception is a rare cause of abdominal pain or melena in adult population [1]. Among older adults, intestinal malignancy must be considered as the leading diagnosis. When radiological modality is considered, ultrasound sonography (US) is the first choice for diagnosing intussusception. However, when air collection is massive due to intestinal obstruction, radiological diagnosis for intussusception with colonic cancer seems superior for computed tomography (CT) to US. In this case report, we report case of intussusception with sigmoid colonic cancer and its CT images in longitudinal view seemed helpful to diagnose the direction of intussusception and identify surgical procedure. In addition, we would propose the classification of viewing of longitudinal CT findings in patients with intussusception to diagnose the direction of intussusception, type M and W for anterograde and retrograde, respectively. This might be helpful to consider surgical option compared with US because of more informative of vessels and lymph nodal involvements.

Case report

A 67 years old male visited outpatient-clinic with complaint of abdominal pain at left lower quadrant (LLQ) and melena. He had laxatives for 2 days because of painful constipation and began to have diarrhea 10 times daily. On our hospital visit, his physical examination showed pain and immobile tumor at LLQ. His digital examination did not felt tumor within 5 cm from the rectal verge. The 3-dimensional MDCT (3D-MDCT) imaging was planned instead of US because of massive air collection due to intestinal mechanical obstruction. The abdominal 3D-MDCT revealed intussuscepted sigmoid colon with suspicious carcinomatous tumor at the leading point of intussusception. Moreover, the sigmoid artery seemed introverted into intussuscepted colon (Fig. 1). The diagnosis of voluminous colo-colonic intussusception was suspected. The intussuscepted sigmoid (distal colon) of intussusception laid paralleled to the leading point in the longitudinal view and it figured out a letter of M (Fig. 2). The main trunk of sigmoid artery was seemed to be drawn in the telescoping colon simultaneously (Fig. 3). The intussusception of sigmoid colon with sigmoid colonic cancer was diagnosed. As he also had history of untreated diabetes mellitus, to avoid colonic perforation or consecutive septicemia, an urgent surgical treatment was done. Under general anesthesia, manual reduction of intussusception after laparotomy was undertaken. The intraluminal mass consistent with colonic cancer could be clearly felt and coexistence of sigmoid colonic cancer was diagnosed from findings of preoperative MDCT images and intraoperative mass. The Hartmann procedure with creation of sigmoidal colostomy was conducted. In results, totally 15 cm in length involving between 10 cm oral from cancerous lesion and distal to the peritoneum reflection. The radical lymph nodes dissection was added at D3 level. The pathological examination of surgical specimen determined the diagnosis of tubular adenocarcinoma, well differentiated type (tub 1). The TNM staging system determined pT2pN0MX, pStage II. On the first postoperative day, he drank liquid and oral intake was started and gradually volume upped according to schedule plan. He has trained well for colostomy self-care and discharged uneventfully on 19th day.

Discussion

Intussusception as rare cause of intestinal obstruction in older adult population

Intussusception in the adult population is extremely rare cause of abdominal pain and melena [1]. Of these, 5%-10% has

Fig. 1 - The Multidetector CT (MDCT) images of the case. (A) The outer sheath of colon (white arrow) surrounds intussuscepted leading point (asterisk). This image showed type M (refer to Figure 4) consists with antegrade type of intussusception. (B) The leading point was noted in longitudinal view (asterisk).
The enhanced-MDCT images showed type M consisted with antegrade intussusception. (A) Orally to the intraluminal mass in the sigmoid colon (black arrows), enhanced sigmoid artery (white arrow) and Y-shaped its branches were invading into the intussuscepted colon. (B) The sagittal section showed longitudinal view of cancerous mass (black arrow).

The reconstructed enhanced-MDCT images. This image showed the main trunk of sigmoid artery was derived from inferior mesenteric artery (thin arrow) also seemed to be drawn in the telescoping colon.

The illustrated classification of types of intussusception. Type M (left) and type W (right), for antegrade and retrograde type of intussusception are shown, respectively. The dotted areas at the leading point represent cancerous lesions in the intestine.

Classification of intussuscepted direction in 3D-MDCT, type M and W

We propose the classification of the direction of intussusception that is identified in the longitudinal views of 3D-MDCT images. When the oral edge as leading point invaginates into anal intestine, it shapes the alphabetical letter of “M”. To contrast, anal edge enters into oral intestine, the longitudinal CT view shapes the letter of “W” (Fig. 4). These 2 types of different intussuscepted direction are consistent with antegrade and retrograde, respectively. Each could be denominated of nomenclature as “type M” or “type W”. These CT longitudinal findings might be helpful to consider treatment modalities. When it seems type M same as this case, which is rarer than...
type W, surgical treatment is the first choice because it seems difficult to reduce using enema procedure.

The classification of cancer involvements of vessels and lymph nodes to consider surgical options

In this case, it was relatively easy to identify the invaginated arterial branch of inferior mesenteric artery into intussuscepted intestine using 3D-MDCT compared with US. Using this novel classification, it seems relatively easy to differentiate the direction of ante- or retrograde. Their treatment modalities are different. The enema reduction is taken in type W because of its enema pressure could reduce intussusception putting enema medium form anus under radiological observation. In contrast, when type is M, the surgical treatment must be considered because of opposite intussusception could not be reduced using enema pressure. In other words, this CT classification is helpful to choose treatment modalities, radiological or surgical. Moreover, comparing radiological information in patients with intussusception with intestinal cancer between CT and US images, CT is more informative of vessel and lymph nodal involvements when malignancy is suspected because ranges of lymph dissection could be decided in CT images.

Conclusion

A 67 years old male with intussusception due to sigmoid colonic adenocarcinoma was treated by surgical procedure. To identify these type, MDCT images of longitudinal views seems helpful. The antegrade intussusception could be denominated type M from its CT findings, whereas the retrograde type is called as type W. This CT classification is helpful to consider treatment modalities, radiological using enema or surgical. Moreover, arterial and lymph nodal involvements visible in 3D-MDCT of older adult patients seem helpful to decide ranges of lymph dissection.

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Patient consent

Informed consent was obtained from the patient for the publication of this case report after her death. This case report was approved by the hospital ethic committee and the approval number is 22-07 (Sep, 24, 2022).

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