Beyond the Bowel: Extraintestinal Manifestations of Inflammatory Bowel Disease

RadioGraphics 2017; 37:1135–1160

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Jeffrey Klein, MD  Hi I’m Jeff Klein, the editor of RadioGraphics and today I’m pleased to have with us doctors Jeffrey Olpin, Sarah Stilwill, and Leif Jensen of the University of Utah, Department of Radiology and Imaging Sciences who are the authors of one of our featured papers in the current July 2017 issue of RadioGraphics. Their paper is entitled “Beyond the Bowel: Extraintestinal Manifestations of Inflammatory Bowel Disease.” Doctors, welcome.

Thank you. Thank you. Thanks for having us.

J.K. Jeff we’re going to begin with you. You and your group have obviously contributed a paper to our multisystem section of the journal that relates to inflammatory bowel disease related manifestations outside of the GI tract. In your paper you cover the whole gamut of organ systems and imaging modalities. How did you and your colleagues come up with this idea and subsequently for the paper that we’re featuring in this podcast?

Jeffrey D. Olpin, MD  Well sure. You know we have a busy inflammatory bowel disease clinic here at the University of Utah, and consequently we’ve had tremendous growth in our CT and MR enterography volumes here over the past several years. I remember very vividly encountering a routine CT examination a few years ago on a young woman that had a clinical history of hyperbilirubinemia and jaundice and as I was reviewing the CT scan I noted that her liver contour seemed a little bit abnormal. She had a few scattered areas of intrahepatic biliary dilatation as well, but the really striking finding on this was the fact that her colon looked diffusely ahuasstral and a little bit featureless and so you know when putting our heads together with my GI colleagues, putting two and two together, we diagnosed her with ulcerative colitis and early manifestation of primary sclerosing cholangitis as well. In my mind this patient’s presentation was a little bit atypical. She presented with liver abnormalities and she had relatively no gastrointestinal symptoms whatsoever and this kind of sparked an interest for me and the relationship between IBD and extraintestinal manifestations or EIMs as they’re coined in the GI literature. So after combing through a number of PubMed searches I discovered that extraintestinal manifestations of IBD in the GI literature is really pretty extensive and comprehensive, although the radiology literature regarding this topic is fairly scant. So I decided this would be a worthwhile topic to explore and submit as an educational exhibit for the RSNA.

J.K. Terrific well we’re obviously very glad that you did that. So Jeff as you mentioned, the first part of your paper you cover some of the recognized hepatobiliary and pancreatic manifestations of inflammatory bowel disease. Perhaps the best know, as you mentioned, or at least the most well recognized of these associations is that of primary sclerosing cholangitis. Can you detail some of the clinical associations between primary sclerosing cholangitis and inflammatory bowel disease and after you do that let’s take a look at Figure 3 which is a nice example of an MRCP that I think illustrates the typical findings of sclerosing cholangitis associated with IBD?

J.D.O. Sure. Well this fixed lab MRCP is obviously a classic example of the diffuse biliary pruning and dilatation that we typically see in the setting of primary sclerosing cholangitis. PSC is obviously a chronic biliary disorder that accounts for the most common hepatobiliary manifestation of IBD. You know and I had always assumed that this relationship between IBD and PSC had existed forever since the beginning of time, but that association wasn’t actually formally established until as recently as 1965. I likewise didn’t realize how prevalent IBD is in PSC patients. Most investigators assert now that about 70 to 80 percent of individuals with PSC have underlying inflammatory bowel disease. And as I alluded to earlier, the sequence of IBD diagnosis in PSC diagnosis may vary. We normally tend to think that these patients are diagnosed with IBD first and then a few years later they establish the diagnosis of PSC, but that isn’t always the case. Particularly interesting to me is the increased incidence of other hepatic disorders that we maybe don’t always classically associate with IBD. So liver disorders may share a common pathogenesis such as PSC and autoimmune hepatitis, while some other liver disorders may be a complication of IBD treatment that we might not always think about or that might not be on our radar such as drug-induced hepatitis and T-cell hepatic lymphoma.

J.K. Well great Jeff, thank you. You know in the same section of the paper I found it very interesting to learn of the association between acute and chronic pancreatitis and inflammatory bowel disease. This is an association that I was not aware of before reading your paper.
J.D.O. Right. You know I likewise wasn’t aware that the incidence was so high, but the literature definitely supports this. You know there’s several theories that account for this. The incidence of gallstones is inherently increased in these IBD patient populations for various reasons, and that likewise accounts for a higher incidence of gallstone pancreatitis. Crohn disease as well, that can involve the duodenum and it can lead to papillary dysfunction with subsequent development of pancreatitis. There’s a number of IBD drugs as well such as azathioprine and 6-mercaptopurine that can lead to drug-induced pancreatitis; sclerosis of the pancreatic ducts that can likewise occur in the setting of PSC that could eventually lead to pancreatitis as well.

J.K. Alright, well thank you for that. So Jeff let’s move on to discuss some of the genitourinary associations with inflammatory bowel disease. You describe enterourinary fistulas as specifically colovesical fistulas as the most common GU condition that’s associated with inflammatory bowel disease. As we review Figure 17 which demonstrates one of these enterourinary fistulas, can you briefly discuss the use of MR for fistula assessment in these patients, particularly in children and young adults who have inflammatory bowel disease?

J.D.O. Yeah, sure. Well enterourinary fistulas they definitely do occur in the setting of IBD and I was fortunate enough to receive this really beautiful example of a rectal adnexal fistula on MR from one of my colleagues here at the University of Utah. Unfortunately, not all fistulas are this obvious at imaging. You know there’s the old adage in radiology that we see what we know on imaging exams and as abdominal radiologists we tend to focus solely on the GI tract when evaluating enterography, but enterourinary fistulas they can be subtle and we’ll miss them if we’re not being very careful, you know carefully scrutinizing the genitourinary tract as well. MR enterography is obviously the modality of choice when assessing IBD in a setting of you know, when evaluating children and young adults in particular due to the inherent benefits of you know non-ionizing radiation. These studies can be inherently more difficult to interpret than CT enterography and there’s definitely a learning curve for MR entero for radiologists that are unaccustomed to viewing these studies. Some tips that I think of when performing MR enterography is adequate distention of the bowel with a negative oral contrast agent such as VoL-umen. Fistulas are inherently very narrow caliber communications and they can mimic a decompressed bowel loop if there’s inadequate bowel distention. You know there’s a number of pulse sequences that we use in MR enterography that can be utilized for fistula assessment, but I find that the T1-weighted post gad images with fat sat are personally the most helpful for me. Cine SSFP images as well can likewise be helpful to differentiate between a bowel loop and a fistula. Obviously bowel loops will peristalse whereas fistulas will not peristalse.

J.K. Great, well thank you for that. Sarah let’s move on to discuss some of the extraintestinal involvement that relates to the musculoskeletal system. In discussing extraintestinal involvement in patients with IBD it’s important that we consider the issue of axial spondyloarthropathy. Can you briefly just summarize the current criteria for the diagnosis of spondyloarthropathy and sacroiliitis and particularly the role that MR plays in patient evaluation, and then let’s look at Figure 21 which I think nicely illustrates some of the spine manifestations of this condition.

Sarah E. Stilwill, MD Sure. MR has truly become such an invaluable modality to evaluate active and acute inflammation. Often time the lesions on MRI are seen many years before the radiographic structural changes. So we, you know if it’s excellent in children, it’s excellent when the radiographs are negative, it really helps our rheumatology colleagues figure out does MR findings of axial disease in the spine and sacroiliitis support a clinical diagnosis? So in terms of criteria, the things that we’re looking for, bone marrow edema and osteitis in combination with enthesitis, capsulitis, and synovitis are truly the kind of the mainstay findings of acute or active inflammation, in particular, the sacroiliac joints. However, I would say the number one diagnostic criteria is bone marrow edema and osteitis. That truly is the one salient feature on MRI that we’re looking for. With respect to the spine and the endplate changes, it’s important to address spondylodiscitis, inflammatory spondyloarthropathy in the spine, looking for the Romanus lesions which we see in this example which include enthesitis at the annular ligament and then more of the central discoversbral lesions for spondylodiscitis so called Andersson lesions now. It is important to differentiate these endplate changes from infection, degenerative changes, but you know combination of the spine findings and the SI joint disease really helps our referring clinicians. So we talked about the active acute inflammatory changes, but remember there’s also that structural bony component subchondral endplate sclerosis, the erosions, and then the eventual bony ankylosis. True you see those in MRI but we can evaluate those also on radiographs. They pertain to sort of long standing inflammation. We’re also looking for fatty marrow degeneration on our T1 sequences on MR. With respect to the discussion on use of gadolinium contrast; it’s sort of a controversial issue both in the literature and in our MSK section. A lot of my colleagues in the past would always give gadolinium contrast to further depict acute inflammation, synovitis, bone marrow edema. But you know now we’re a little bit more conservative in our administration of gadolinium contrast. In particular in children because we don’t know the long-term effects of gadolinium in the body and in the brain. So if I don’t see findings of osteitis or bone marrow edema on our non-contrast T1 or STIR sequences, I’m pretty reluctant to give gadolinium contrast. If there’s a question of inflammatory versus infectious sacroiliitis or spondylodiscitis, of course we give the IV contrast, but we’ve really sort of changed our approach to using contrast nowadays.

J.K. Sarah, thank you. That’s terrific. So Leif let me ask you now as a chest guy you know I have to discuss the thoracic manifestations of inflammatory bowel disease which I think many chest folks are unaware of to be honest. You describe airways disease as the most common thoracic man-
ifestation associated with inflammatory bowel disease. Is that correct?

Leif E. Jensen, MD, MPH That’s right Jeff.

J.K. Well let’s look at Figure 26 which I think really nicely illustrates some central airway involvement in a patient with inflammatory bowel disease.

L.E.J. That’s right; the airways are the most common thoracic manifestation. Although we don’t really understand the mechanisms very well, but it seems that the same inflammatory pathways that are impacting on the bowel also can involve the airways. Very often in the patient’s symptoms, whether it’s cough or wheezing are quite mild and maybe subclinical and overlooked when these patients present. In terms of the airways involved, it’s usually the larger airways that are involved as demonstrated in the example in the paper, but the small airways can also be affected by this. The most common imaging abnormality is bronchiectasis, but we can also observe as in this example bronchial wall thickening or tracheal thickening, occasionally tree-in-bud opacity and if we had done more excretory images we could see more air trapping on high resolution chest CT.

J.K. Terrific. Thank you. Leif another important point that I think you made in the paper is the higher instance of pulmonary infection and the higher relative risk of venous thrombosis and pulmonary embolism in patients with inflammatory bowel disease. This is again something that I think most of us in the chest radiology world are probably unaware of.

L.E.J. According to the meta-analysis that I mentioned in the paper that looked at a number of case control and cohort studies, the relative risk increase in patients with inflammatory disease is two-fold. And interestingly the distribution of risk does not seem to be affected by whether the patient is in an active or quiescent inflammatory phase of their inflammatory bowel disease. So it certainly has informed my practice to have that knowledge to whenever there’s contrast present on the CT chest I make special note to assess the pulmonary arteries. With regard to infection in the chest there’s also an increased risk associated with inflammatory bowel disease and one of the challenges that we have when patients present with pulmonary findings, it’s really to tease out the primary manifestations of disease from the treatment related complications. Many of the medicines that are used for the treatment of inflammatory bowel disease are either immunosuppressants or immune modulators which predispose patients to infections. So while community-acquired bacterial pneumonia is still the most common manifestation that was found in patients with inflammatory bowel disease, we also need to think more broadly about opportunistic infections like tuberculosis as well as fungal pneumonias. Another nuance or complication is that some of the medicines that are administered also can produce pulmonary toxicities which can look much like infection, particularly the organizing pneumonia pattern and so we need to think very broadly when these patients present with new pulmonary opacities.

J.K. Terrific. Well Leif thank you very much for that. So Doctors Olpin, Stilwill, Jenson, I want to thank you for taking the time today to discuss your paper which addresses the extraintestinal manifestations of inflammatory bowel disease. Your paper, this paper, can be found in the current July 2017 issue of RadioGraphics. Doctors thank you very much for your time today.

Thank you so much.

Appreciate it.

Thank you.