MRI-MRCP findings in focal and diffuse autoimmune pancreatitis and comparison of focal type of the head and of the body-tail

Poster No.: B-0005
Congress: ECR 2016
Type: Scientific Paper
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Keywords: Pancreas, Abdomen, MR, Contrast agent-intravenous, Inflammation

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Purpose

To evaluate the MRI-MRCP findings of focal-type and diffuse autoimmune pancreatitis (AIP) and to compare, among focal-types, involvement of the head and the body-tail.

Methods and materials

we retrospectively considered all the Patients in who an AIP was suspected in our hospital between February 2001 and September 2015. From this 212 patients, we excluded 30 patients because they didn't satisfied the International Consensus Diagnostic Criteria (ICDC 2012), 52 patients because there was no MRI, 18 patients because there MRI was performed only after steroid therapy.

The MRI of the 112 included patients were analyzed by two radiologists and the discrepancies were solved by consensus.

The qualitative image analysis included:

1. presence of focal or diffuse involvement of the pancreas;
2. presence or loss of the normal lobular structure of the gland;
3. signal intensity alterations of the pancreatic parenchyma on T1-, T2- and diffusion-weighted images as compared to the liver or to the unaffected parenchyma, (hypo-, iso-, or hyperintense)
4. signal intensity after contrast medium administration of the affected parenchyma;
5. presence of tortuosity of the MPD upstream the stenosis; dilatation of side branches;
6. thickening of the common bile duct (CBD) wall (> 2mm), during the delayed phase of the contrast enhancement;
7. presence of stenoses of the CBD;
8. presence of stenoses of intrahepatic bile ducts;
9. presence of renal lesions;
10. presence of retroperitoneal fibrosis.

The quantitative image analysis included:

1. number of stenoses of the main pancreatic duct;
2. length of the MPD stenosis;
3. diameter of the MPD upstream the lesion.
We firstly compared the characteristics of focal and diffuse AIP and then we analyzed the differences between focal AIP of the head and of the body tail.

The comparisons were made by Chi-squared test for qualitative variables and by Kruskal-Wallis test for quantitative ones.

Results

61/112 (54,5%) patients had diffuse AIP of pancreas (Fig. 1) and 51/112 (45,5%) focal involvement (Fig. 2).

The affected parenchyma was hypointense on T1-WI in 60/61 (98,3%) of diffuse AIP and in 50/51 (98%) of focal involvement (p=NS); on T2-WI the involved pancreas was hyperintense in 44/61 (72,1%) patients with diffuse involvement and in 33/51 (64,7%) of focal AIP (p=NS).

The DWI was available in 24/61 (39,3%) patients with diffuse AIP and in 28/51 (54,9%) patients with focal AIP; there was a restricted diffusion in 19/24 (79,2%) diffuse pancreatitis and in 17/28 (60,7%) focal pancreatitis (p=NS) (Fig. 3).

The lesions were hypointense in arterial phase (93,4% in diffuse AIP vs 92,2% in focal AIP) with delayed enhancement (88,5% in diffuse vs 80,4% in focal) (p=NS). During venous phase, 39,2% of focal-type and 14,7% of diffuse AIP showed hyperintensity (p=0,003).

In the diffuse AIP there was at least one stenosis of the main pancreatic duct in 47/61 (77%) patients against 35/51 (68,6%) of the focal AIP (p=NS). Side-branch dilations were present in 23/61 (37,7%) patients with diffuse involvement and in 27/51 (52,9%) patients with focal involvement (p=NS). (Fig. 4)

The caliber of the upstream MPD was higher in focal-type than in diffuse AIP (3,1mm vs 2,4mm, p=0,017).

A thickened wall of the main biliary duct (MBD) was observed in 15/61 (24,6%) patients with diffuse AIP and in 13/51 (25,5%) of the focal AIP (p=NS); a narrowing or a stenosis of the MBD was present in 30/61 (49,2%) of diffuse AIP and in 25/51 (49%) of focal AIP (p=NS). The involvement of intra-hepatic biliary ducts was present in 17/61 (27,9%) of diffuse involvement and in 18/51 (35,3%) of focal AIP (p=NS).

An extra-pancreatic disease (renal (Fig. 5) or retroperitoneal) didn't differ significantly.

Among patients with focal AIP, 21/51 (41,2%) showed involvement of the head and 30/51 (58,8%) of the body-tail.
In 42.8% of patients with head involvement and in 16.7% with body-tail AIP there was a multifocal stenosis of MPD (p=0.03). Caliber of upstream duct was higher in AIP of the head (mean caliber: 4mm vs 2mm, p=0.03).

42.8% of AIP with head involvement and 16.7% with body-tail involvement demonstrated a narrowing or a stenosis of the MBD (p=0.03).

Images for this section:

Fig. 1: T1 fat-sat axial images: a) before contrast, b) arterial phase, c) portal phase, d) delayed phased. Hypointense diffuse AIP before contrast, hypovascular in arterial phase and delayed enhancement

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Fig. 2: T1 fat-sat axial images: a) arterial phase, b) portal phase, c) and d) delayed phased. Hypointense focal AIP (arrows) before contrast, hypovascular in arterial phase and delayed enhancement

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Fig. 3: a) DWI b800, b) ADC map: restricted parenchyma (hyperintense in high b-value and hypointense in ADC) in a focal AIP of the head.
**Fig. 4:** a) and b) CPRM. a) stenosis of the main pancreatic duct (arrow) with dilated upstream duct and side-branch ducts b) multiple stenoses of the main pancreatic duct (arrow heads) with cholangitis

**Fig. 5:** T1 fat-sat axial image after contrast injection (portal phase): hypovascular diffuse AIP with right nephritis (arrow)
Conclusion

Focal-type AIP showed an earlier delayed enhancement and a greater dilation of upstream MPD in comparison with diffuse AIP.

Head involvement demonstrated a higher frequency of multifocal stenosis of MPD and a greater caliber of it in comparison with body-tail involvement.

Personal information

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