

## MESENTERIC PANNICULITIS

### PART 2: PREVALENCE AND NATURAL COURSE: MDCT PROSPECTIVE STUDY

B. Coulier<sup>1</sup>

**Background:** Mesenteric panniculitis (MP) is an uncommon benign inflammatory condition of unknown etiology that involves the adipose tissue of the mesentery. It can be evaluated as a single disease with two pathological subgroups: MP, representing the very large majoritary subgroup where inflammation and fat necrosis predominate and Retractable Mesenteritis, rarely found, where fibrosis and retraction predominate.

**Objective:** To re-estimate the prevalence of MP in general population through a large prospective study, to compare the results with those of the literature and to evaluate the natural course of the condition.

**Methods:** A continuous series of 613 consecutive unselected patients (280 females and 333 males) imaged with abdominal MDCT for various neoplastic (27%) or non neoplastic conditions (73%) constitutes the prospective material. A positive CT diagnosis of MP was based on the observation of at least three of five typical CT signs comprising: the presence of a well-defined "mass effect" on neighbouring structures (sign 1) constituted by mesenteric fat tissue of inhomogeneous higher attenuation than adjacent retroperitoneal or mesocolonic fat (sign 2), containing small soft tissue nodes (sign 3) typically surrounded by a hypoattenuated fatty "halo sign" (sign 4). Finally a hyperattenuating pseudocapsule may surround the all entity (sign 5).

**Results:** A positive diagnosis of MP was made in 48 patients (prevalence of 7,83%) on the basis of the presence of at least 3 CT signs. After reconsidering the presence of the "halo sign" (sign 4) and of the "pseudocapsule" (sign 5) as "sine qua non" conditions for a positive diagnosis, a more restricted positive group of 21 cases was constituted (prevalence of 3,42%) comprising 10 males (3%) and 11 females (3,93%). There were 14 "non-neoplastic" patients – 6 males (2,27 %) and 8 females (3,6%) – and 7 "neoplastic" patients – 4 males (3,73%) and 3 females (5,17%) –.

**Conclusions:** The prevalence of MP appears much higher than previously reported and the reason probably resides in the major technological evolution experienced in CT imaging during the last decade. This high prevalence probably explains the spontaneous association with the numerous and probably unrelated clinical situations found in the literature. Finally the vast majority of cases are considered as idiopathic, benign and asymptomatic. Except a discrete higher prevalence found in patients presenting with bladder and/or prostatic neoplasms and with lymphoma in group 1 the general prevalence of MP in our study doesn't significantly differ in the "neoplastic" and "non neoplastic" groups of patients. We conclude that the value of MP in term of predictivity of an associated neoplasm is probably non relevant. Finally PET/CT is proved useful to correctly exclude mesenteric tumoral involvement in patients presenting with typical MP and follow-up studies show a great stability of the CT findings of MP in about 85% of cases.

**Key-words:** Mesentery, diseases – Mesentery, CT.

Mesenteric panniculitis (MP) is an underdiagnosed uncommon benign inflammatory condition of unknown etiology that involves the adipose tissue of the mesentery and for which an extremely varied terminology has been used, causing considerable confusion. Now it can be evaluated as a single disease with two pathological subgroups: MP, representing the very large major subgroup where inflammation and fat necrosis predominate and retractile mesenteritis, rarely found, where fibrosis and retraction predominate. In histo-pathological terms the preferred terminology is sclerosing mesenteritis.

The goal of this study was to re-estimate the prevalence of MP in general population through a large prospective study, to compare the results with those of the literature and to evaluate the natural course of the condition.

#### Material

During a 22 weeks period the same experienced radiologist scrupulously searched for signs of mesenteric panniculitis (MP) on all abdominal CT performed during his own CT attendances. A continuous series of 613 unselected patients comprising 280 females (16-95 years,

mean age 65 +/- 15, 25 years) and 333 males (20-89 years, mean age 63,66 +/- 14,65 years) was constituted. The patients were scanned with two different 64-row MDCT machines (Lightspeed Ultra and Lightspeed VCT, General Electric, Wisconsin). The collimation was 64 x 0.65 mm with a pitch comprised between 0.516 and 1.375. The 1.25/0.65 mm or 1.25/1.25 axial series were used for axial cineview analysis and dynamic MPR on a Workstation (Advantage Workstation 4.3 and 4.4, General Electric, Wisconsin).

On the basis of their clinical records the patients were classified as "neoplastic" (diagnosis and /or follow-up) (n = 165 or 27%) and "non neoplastic" patients (n = 448 or 73%). The "neoplastic" group was composed of 107 males (32% of males) and 58 females (20,7% of females) and the "non neoplastic" group was composed of 226 males

From: 1. Department of Diagnostic Radiology, Clinique St Luc, Bouge, Belgium.  
Address for correspondence: Dr B. Coulier, M.D., Department of Diagnostic Radiology, Clinique St Luc, Rue St Luc 8, B-5004 Bouge (Namur) Belgium.  
E-mail: bcoulier@skynet.be

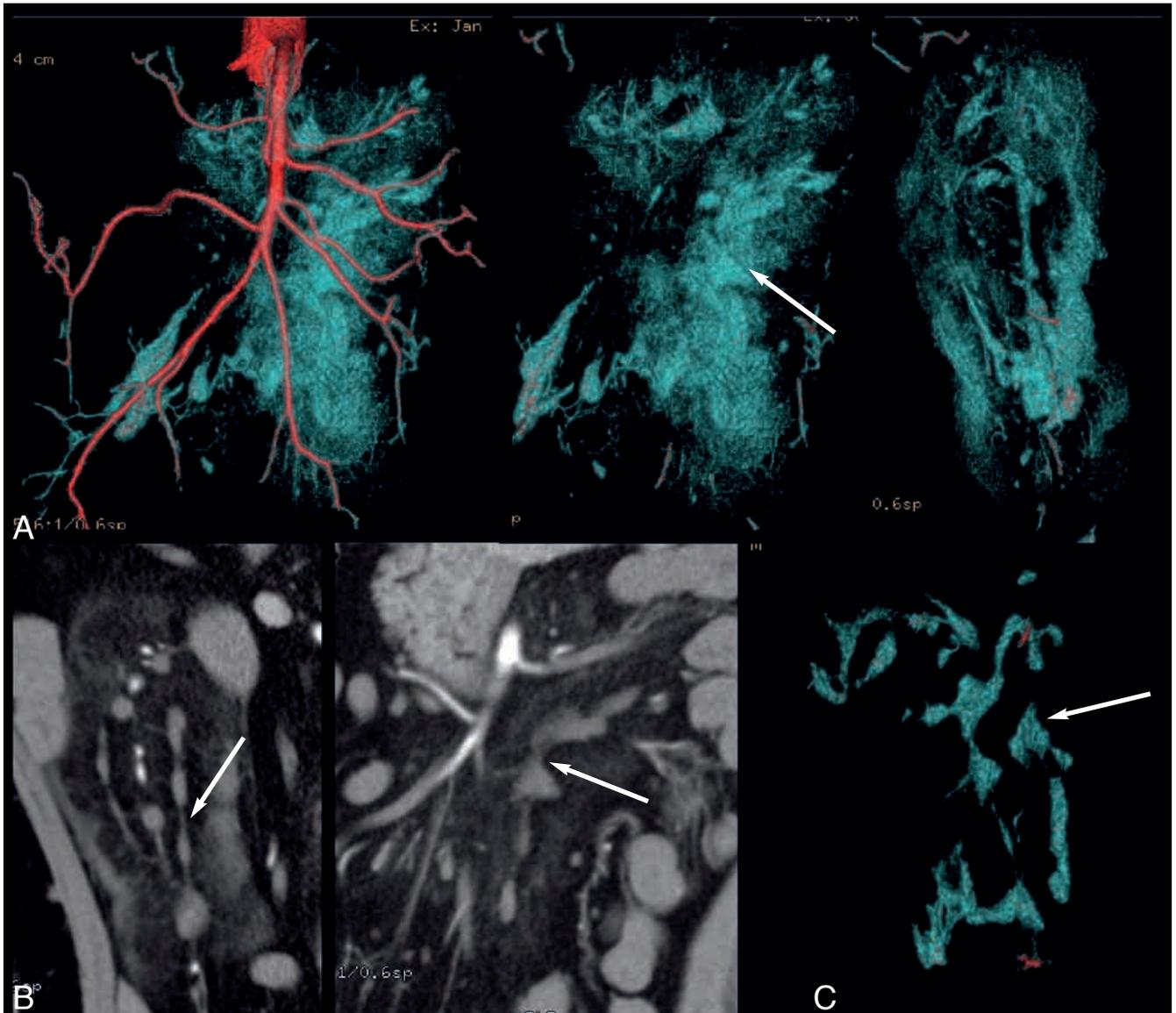
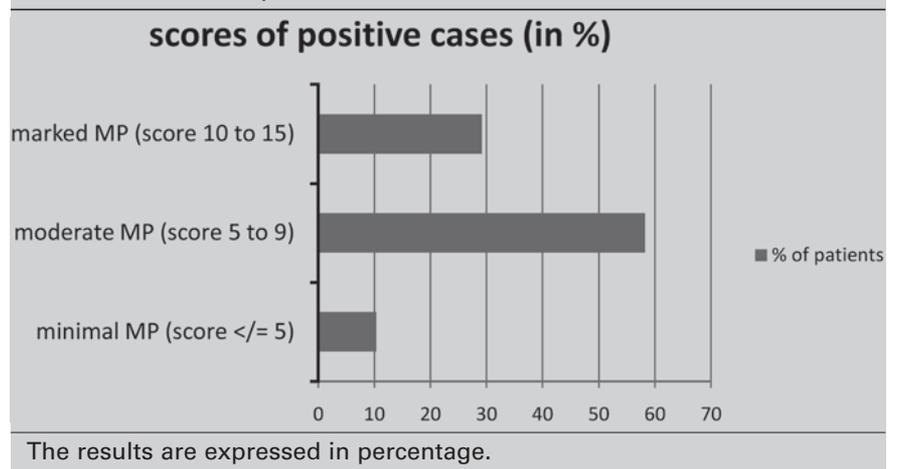


Fig. 1. — A: volume rendering view, B: sagittal and coronal oblique MPR views and C: selective volume rendering view of nodes obtained in a 57 year-old patient presenting with a sharp mesenteric panniculitis. The CT was performed to study the renal arteries in a context of hypertension. All typical signs are present and the typical nodes, surrounded by a halo (white arrows) have a ramified and irregular shape.

(68% of males) and 222 females (79,3% of females).

A positive CT diagnosis of MP required the presence of at least 3 typical signs comprising: a well-defined "mass effect" on neighbouring structures (sign 1) constituted by mesenteric fat tissue of inhomogeneous higher attenuation than adjacent abdominal fat (sign 2) containing small soft tissue nodes – lymphadenopathies – (sign 3) which may be surrounded, like mesenteric vessels, by an hypoattenuated fatty halo (sign 4). The last sign (sign 5) was constituted by the presence of a hyperattenuating pseudocapsule surrounding the mesenteric fat tissue.

Table I. — Scores of positive cases.



The signs were scored in four grades: absent (score 0), discrete (score 1), moderate (score 2) and marked (score 3).

A case was being considered positive when at least 3 signs were simultaneously present. Thus the minimal positive score was 3 (score 1 for at least 3 signs) and the maximal score was 15 (score 3 for all five signs). Globally MP was arbitrary characterised as minimal (score  $\leq 5$ ), moderate (score 5 to 9) or marked (score 10 to 15).

The medical records of the "positive" patients were systematically reviewed and all their previous and subsequent abdominal CT examinations were retrieved from our picture archiving system (PACS) and secondarily reinterpreted by the same radiologist to follow the evolution of MP.

## Results

The positive diagnosis of MP was conditioned by the presence of at least 3 positive CT. With this criteria 48 patients (= group 1) (7,83%) were found positive comprising 19 females (6,79%) and 29 males (8,71%) (M/F ratio = 1/1,28). MP was found in 31 "non neoplastic" patients (6,9%) comprising 16 males (7,5%) and 15 females (6,75%). 17 "neoplastic patients" were positive (10,3%) comprising 13 males (12,1%) and 4 females (6,9%) (Table II). The malignancies included colorectal adenocarcinoma (23,5%), vesical and prostatic neoplasms (41,2%), lymphoma (11,8%) and miscellaneous malignancies (23,5%). 14,9% of vesico-prostatic neoplasms and 15,4% of lymphoma were associated with MP.

MP was scored as minimal (score  $\leq 5$ ) in 5 cases (10,4%), moderate (score 5 to 9) in 28 cases (58,3%) and marked (score 10 to 15) in 14 cases (29,16%). The mean general score was 8 in "neoplastic" and 7,9 in "non neoplastic" patients (Table I).

Signs 1 to 3 were present in all cases but the "halo sign" (sign 4) (figures 1-5) and a "pseudocapsule" (sign 5), which are considered in the literature as the most typical and specific CT signs of MP were absent respectively in 6 (12,5%) and 27 (56%) of the 48 "positive" cases.

After reconsidering the presence of the "halo sign" (sign 4) and of a "pseudocapsule" (sign 5) as "sine qua non" conditions for a positive diagnosis, a restricted positive group of 21 cases (group 2) was constituted (prevalence of 3,42%) com-

prising 10 males (3%) and 11 females (3,93%). There were 14 "non-neoplastic" patients – 6 males (2,27 %) and 8 females (3,6%) – and 7 "neoplastic" patients – 4 males (3,73%) and 3 females (5,17%) (Table II).

A CT follow-up was available in 25 (52%) of the 48 positive patients of the group 1. The follow-up period was varying from 9 to 104 months

(mean 36 +/- 21 months). A discrete majoration of score was observed in only 2 patients and a subtle regression was observed in 2 patients. The great majority of cases (21/25 = 84%) appeared extremely stable during follow-up studies. The same result was found in the restricted positive group (group 2) in which 85,7% of the 14 patients with follow-up

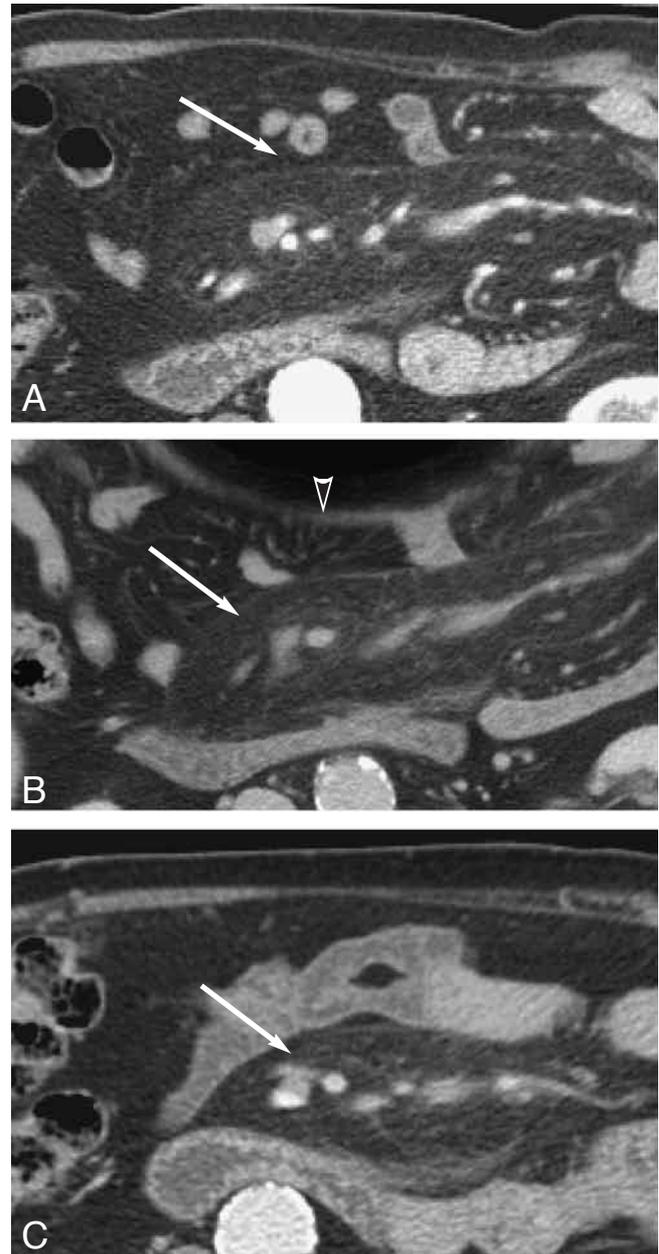


Fig. 2. — A, B: axial CT views obtained during abdominal CT performed in a 82 year-old patient presenting with hematuria. B is obtained during abdominal compression (black arrowhead) performed for analysis of the pyelocaliceal tree and illustrates the incompressibility of the panniculitic mesentery. C is obtained 27 months later and panniculitis is still present and appears unchanged. In this patient hematuria was finally attributed to vesical transitional tumor which secondarily extended to the liver.

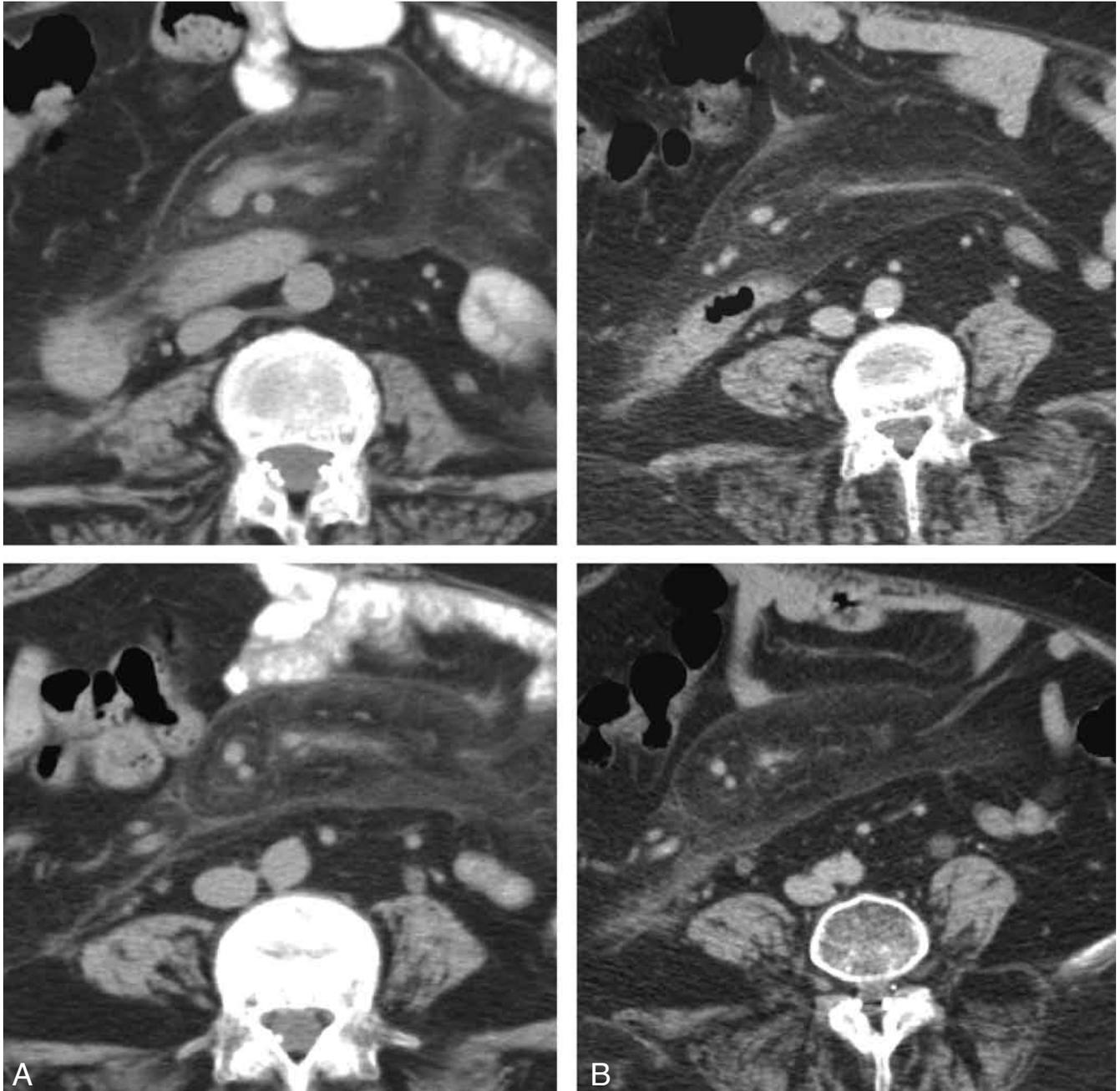


Fig. 3. — A: axial CT views obtained during abdominal CT performed in a 72 year-old female patient suffering from bladder cancer. A marked panniculitis is found and remains extremely stable on similar axial CT views (B) obtained 104 months later.

studies (mean 34 +/- 25 months) remained stable.

### Discussion

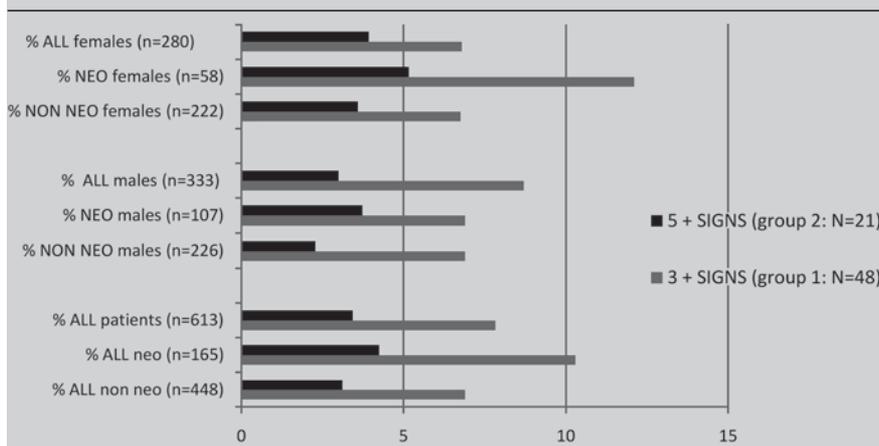
Mesenteric Panniculitis (MP) is a benign fibrosing and inflammatory condition that involves the adipose tissue of the mesentery (1-5) and this uncommon disorder of unknown etiology is likely underdiagnosed (6). In histo-pathological terms, the preferred terminology is Sclerosing Mesenteritis (1, 3, 7-9). It represents the more accurate term because of

the presence of some degree of fibrosis as a common denominator (4, 9).

Most studies have indicated that the disease is more common in men, more frequent between the 6<sup>th</sup> and 7<sup>th</sup> decades of life, with a male/female ratio of 2-3:1, and several reports have indicated it to be more common in Caucasian men (1-2, 4, 6, 10-11). In our series the male predominance appeared less evident with a male/female ratio of 1,28:1. Pediatric cases are exceptional, probably because children have less mesenteric fat when compared to adults.

Classically on CT, MP appears as a mass of increased-attenuation mesenteric fat containing small soft-tissue nodes, with a maximal transverse diameter directed toward the left abdomen consistent with the orientation of the jejunal mesentery. The mesenteric soft-tissue nodes ranged between immeasurable, numerous small nodules, to discrete nodes measuring up to 0.9 cm in the short axis and 1.9 cm in the long axis. Two CT findings are considered more specific for the diagnosis of MP as they have not been reported in

**Table II. — Prevalence of Mesenteric panniculitis in the different groups of patients for the two positive groups: group 1 characterized by at least 3 "positive" CT signs and group 2 in which all 5 typical CT signs are present including the "halo sign" and the presence of a "pseudocapsule."**



other mesenteric diseases (1, 4, 6, 12-15): the presence of a tumoral pseudocapsule (found in up to 60% of MP reported cases) and the "fat ring" sign of hypodense fatty halo surrounding mesenteric nodules and vessels (seen in up to 75% of reported cases) (1, 6, 8, 16-18) (Fig. 1).

The overall prevalence of MP in abdominal CT examinations has previously been estimated at approximately 0.6%, commonly appearing as an incidental finding, mostly in middle or late adulthood (1, 4, 8, 19). It is our opinion that this prevalence has probably been extremely underestimated when compared with the results of our prospective study which shows a mean prevalence of 7,83% when at least 3 CT signs are found (group 1) and still of 3,42% when all five CT signs are considered (group 2) including the "halo sign" and the presence of a "pseudocapsule." The reason probably resides in the major technological evolution experienced in CT imaging during the last decade. When compared with the CT parameters of the study of Daskalogiannaki (19) (where 10-mm-thick continuous axial views are analysed) there is no doubt that the dynamic multiplanar examination of hundreds of millimetric views allows a much higher sensitive diagnosis of sometimes subtle mesenteric abnormalities.

In the large but single series of MP of Daskalogiannaki was related to malignancy in 69% of patients (19). These malignancies included mostly urogenital or gastrointestinal adeno-

carcinoma or lymphoma but also breast and lung cancer and melanoma. In our study MP is found heaving not only a much greater prevalence than previously reported but moreover this prevalence doesn't not significantly differs in the two - "neoplastic" and "non neoplastic" - groups. MP thus probably represents an idiopathic phenomenon whose value in term of predictivity of associated neoplasm is probably not relevant. A discrete higher prevalence of MP was only found in patients presenting with vesical and prostatic neoplasms and with lymphoma in group 1.

Daskalogiannaki et al. (19) also noted that an association between MP and lymphoma had been suggested in the previous literature. In our series, MP was effectively associated with lymphoma in a higher percentage (15,4% of patients of the group 1) than in the general population.

A wide variety of clinical manifestations of MP have been described which are very inconstant and non-specific (1, 3) but as many as half of the cases reported MP has been an incidental finding in asymptotically presenting patients (3, 16). It's also our opinion that this proportion of asymptomatic presentations is extremely much higher.

Such a wide variety of potential clinical manifestations would first mean that a large number of illnesses must be considered for differential diagnosis. For us the real unanswered question is: are all these various symptoms really related to MP

or do they only represents the unrelated features which lead patients to imaging studies? As suggested by our results the relatively high prevalence of MP probably explains a spontaneous association with numerous and probably unrelated clinical situations.

The course of MP is favorable in most cases, because the disease usually progresses slowly and subsides spontaneously. In about 20% of patients – but it is not sure that this high percentage is not overestimated – MP is associated with significant morbidity and a chronic debilitating course (6). Nevertheless Daskalogiannaki (19) found a great stability of the CT findings of MP in 20/21 patients in which follow-up abdominal CT examinations were available within an interval of 5 months to 3 years. Only one patient showed a slight increase of the fatty mass. Our results are exactly the same. In the 25 patients in which a follow up was available – within a mean interval of 36 +/- 21 months – 21 (84%) showed an extremely stable appearance of their MP (Fig. 2-3). A discrete increase in score was observed in only 2 patients and a subtle regression was observed in 2 patients.

**Conclusions**

The prevalence of MP was much higher in our study than previously reported in the literature and the reason probably resides in the major technological evolution experienced in CT imaging during the last decade. This high prevalence probably explains the spontaneous association with the numerous and probably unrelated clinical situations found in the literature. Finally the vast majority of cases are considered as idiopathic, benign an asymptomatic. Except a discrete higher prevalence found in patients presenting with bladder and/or prostatic neoplasms and with lymphoma in group 1 the general prevalence of MP in our study doesn't significantly differs in the "neoplastic" and "non neoplastic" groups of patients. We conclude that the value of MP in term of predictivity of an associated neoplasm is probably not relevant.

Finally PET/CT is proved useful to correctly exclude mesenteric tumoral involvement in patients presenting with typical MP and follow-up studies show a great stability of the CT findings of MP in about 85% of cases.

## Bibliography

1. Coulier B. Mesenteric panniculitis (part I): MDCT – pictorial review. *JBR-BTR*, 2011, 94: 229-240.
2. Issa I., Baydoun H.: Mesenteric panniculitis: various presentations and treatment regimens. *World J Gastroenterol*, 2009, 15: 3827-3830.
3. Chawla S., Yalamarthi S., Shaikh I.A., Tagore V., Skaife P.: An unusual presentation of sclerosing mesenteritis as pneumoperitoneum: case report with a review of the literature. *World J Gastroenterol*, 2009, 15: 117-120.
4. Sabaté J.M., Torrubia S., Maideu J., et al.: Sclerosing mesenteritis: imaging findings in 17 patients. *AJR*, 1999, 172: 625-629.
5. Kara T., Canyigit M.: Relationship between abdominal trauma or surgery and mesenteric panniculitis. *World J Gastroenterol*, 2009, 15: 6139.
6. Ferrari T.C., Couto C.M., Vilaça T.S., Xavier M.A., Faria L.C.: An unusual presentation of mesenteric panniculitis. *Clinics (Sao Paulo)*, 2008, 63: 843-844.
7. Vettoretto N., Diana D.R., Poiatti R., et al.: Occasional finding of mesenteric lipodystrophy during laparoscopy: a difficult diagnosis. *World J Gastroenterol*, 2007, 13: 5394-5396.
8. Zissin R., Metser U., Hain D., Even-Sapir E.: Mesenteric panniculitis in oncologic patients: PET-CT findings. *Br J Radiol*, 2006, 79: 37-43.
9. Lawler L.P., McCarthy D.M., Fishman E.K., Hruban R.: Sclerosing mesenteritis: depiction by multi-detector CT and three-dimensional volume rendering. *AJR*, 2002, 178: 97-99.
10. Levy A.D., Rimola J., Mehrotra A.K., Sobin L.H.: From the archives of the AFIP: benign fibrous tumors and tumorlike lesions of the mesentery: radiologic-pathologic correlation. *Radiographics*, 2006, 26: 245-264.
11. Delgado Plasencia L., Rodríguez Ballester L., López-Tomassetti Fernández E.M., et al.: Mesenteric panniculitis: experience in our center. *Rev Esp Enferm Dig*, 2007, 99: 291-297.
12. Mindelzun R.E., Jeffrey R.B. Jr., Lane M.J., Silverman P.M.: The misty mesentery on CT: differential diagnosis. *AJR*, 1996, 167: 61-65.
13. Katz M.E., Heiken J.P., Glazer H.S., Lee J.K.: Intraabdominal panniculitis: clinical, radiographic, and CT features. *AJR*, 1985, 145: 293-296.
14. Nguyen B.D.: F-18 FDG PET demonstration of sclerosing mesenteritis. *Clin Nucl Med*, 2003, 28: 670-671.
15. Mata J.M., Inaraja L., Martin J., Olazabal A., Castilla M.T.: CT features of mesenteric panniculitis. *Comput Assist Tomogr*, 1987, 11: 1021-1023.
16. Zafar A.M., Rauf M.A., Chawla T., Khanda G.: Mesenteric panniculitis with pedal edema in a 33-year-old Pakistani man: a case report and literature review. *J Med Case Reports*, 2008, 2: 365.
17. Azzam I., Croitoru S., Naschitz J.E.: Sclerosing mesenteritis: a diagnostic challenge. *Isr Med Assoc J*, 2004, 9: 567-568.
18. Okino Y., Kiyosue H., Mori H., et al.: Root of the small-bowel mesentery: correlative anatomy and CT features of pathologic conditions. *Radiographics*, 2001, 21: 1475-1490.
19. Daskalogiannaki M., Voloudaki A., Prassopoulos P., Magkanas E., Stefanaki K., Apostolaki E., Gourtsoyiannis N.: CT evaluation of mesenteric panniculitis: prevalence and associated diseases. *AJR*, 2000, 174: 427-431.