ABDOMINAL ECHOGRAPHY ON HIV INFECTED PATIENTS

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Abstract. The study assesses abdominal echographic findings (AEF) in 204 HIV-positive patients. The most frequent AEF were found on the liver (46% hepatomegaly, 43.6% hyperechogenity, 26% steatosis), spleen (49.9% hypertrophy, 26% hyperechogenity, 18.7% calcifications) and kidney (24% hypotrophy, 15.2% lithiasis, 13.7% loss of corticomedular differentiation, 11.7% caliceal enlargement). Pelvic echography was available in 70/103 women for diagnosis of pregnant uterus (19), ovarian cyst (4), polycystic ovary (15), uterine fibroma (2). Statistical correlations were found: hepatomegaly – male sex (p=0.03), hepatomegaly – immunity (p=0.004), steatosis – female sex (p=0.002), steatosis – lipodystrophy (p<0.001), liver hyperechogenity – HBV (p=0.02); the span of antiretroviral experience influenced kidney hypotrophy (p=0.011) and kidney structural findings (KSF) (p<0.001); TB was related to splenic calcifications (p<0.001) and KSF (p=0.035); Indinavir experience showed kidney hypotrophy (p<0.001) and KSF (p<0.001). HIV related AEF were found in 89% patients. Echography is an effective method for the management of HIV infection evolution and antiretroviral therapy.

Keywords: HIV, echography, abdomen

Morphology alterations of the abdominal parenchymatous organs in HIV-positive patients are the direct consequences of HIV pathogenesis but also of complex associated diseases.

There are few previous studies on abdominal echographic findings (AEF) in HIV-positive patients:
- 30.2% out of 116 HIV positive patients presenting long-term fever exhibited specific echographic alterations: 12 had multiple hypoechoic splenic lesions (34.3%), 11 abdominal adenopathies (31.4%), 9 splenic lesions and adenopathies (25.7%) and 3 showed hepatosplenic involvement and adenopathies (8.6%). Although infrequent, the presence of multiple hypoechoic splenic lesions revealed an elevated specificity (>95%) for the diagnosis of extra pulmonary tuberculosis [4].
- 67% out of 112 HIV-positive patients had abdominal echographic alterations: 50% hepatomegaly, 38.3% splenomegaly, 6, 2% affections of the biliary and/or vesicular ducts; the echographic findings were not related to the stage of the HIV infection, or to the presence of hepatic biochemical disorders. The presence of organomegaly was more frequent in the group with infectious complications that in the patients without associated infectious processes, 33.3% vs. 19.6% (p < 0.01) [5].
- 108 out of 204 patients treated with Indinavir containing regimens developed renal alterations: nephrolithiasis 27.8%, hyperechogenity 25%, 16.7% nefrocalcinosis, 13.9% renal hypotrophy, 13.9% pielocalyceal dilation, 12.5% cortical lobulation, 12.5% cortical thinning.
11.1% hydronephrosis [1].
- 72 out of 216 patients with HIV either symptomatic or asymptomatic infection developed echographic abdominal findings: 10% adenopathies, 7.8% hepatomegaly, 7.4% splenomegaly, 2.3% renal lesions, 1.3% ascites; tuberculosis is the first aetiology of multiple hypoechoic lesions of the spleen, especially when microbiologic diagnosis is not available [8].

Objectives
Echographic assessment of abdominal organs’ sizes and echostructure in HIV patients.

Material and methods
- Prospective study on 204 patients, based on 359 echographic exams (1-5 exams/ patient), during 2006-2008.
- Standard abdominal echographic method in real time, B mode using Mindray echographic equipment with convex transducer of 3.5 MHz, systematically performed for yearly evaluation of patients with HIV infection. Additional exams were recommended for the diagnosis of fever of unknown origin, abdominal pain and alteration of hepatic or renal biochemistry tests.
- Characteristics of the patients:
  - Sex distribution M/F: 101/103
  - Living Urban/ Rural aria: 101/103
  - Median age: 19 [18; 53] years old
  - The time span since HIV diagnosis: median 76 [3 – 226] months
  - Clinic or immunologic AIDS stage: 74.5%
  - Treatment status: 181 (89%) patients experienced antiretrovirals with 1-8 regiments, during median 73 [3-130] months
  - Comorbidities: VHB co-infection 38%; VHC co-infection 2.8%; previous or active tuberculosis (TB) 32%; lipodystrophy 56%.
- Microsoft Excel with Analysis Tool Pack and XLStats software for statistic analysis.

Results and discussions:
Normal liver echography in 35.7% patients (fig. 1). 170 patients (83.1%) had hepatomegaly, either global (55.2%) or only addressing the left lobe (44.7%). The rate of hepatomegaly was higher compared to past studies [1, 2], due to the more advanced history of HIV infection and cumulated hepatotoxicity of antiretroviral treatment in our study [4, 5]. Hepatomegaly was more frequent in males than females (CI [1,06; 3,60]; OR 1,95; p=0,03) and was related to the severity of immunosuppression expressed through CD4 lymphocyte number (CI [1,7; 6,3]; OR 3,02; p=0,004). Structural alterations of the liver were hyperechogenicity (43.6%) and steatosis (26%). The following correlations have been found: hyperechogenicity – VHB co-infection (CI [1,09; 5,30]; OR 2,41; p=0,02), steatosis – female sex (CI [1,56; 8,17]; OR 3, 57; p=0,002) and steatosis – lipodystrophy CI [1,85; 9,64]; OR 4,23; p<0,001). Hydatic cyst was revealed in 2 patients (1%), both cases being relapses after surgical interventions performed before HIV diagnosis (fig. 2).
Unique or multiple haemangioma (size 5-48 mm) were visible in 4 patients (fig. 3). 2% frequency of haemangioma matches the range of 0.4-7.4% determined through prevalence studies [3].

Splenomegaly was reported in 49.9%. Median size of the long axis of the spleen was 123mm [94; 203mm]. Structural alterations of the spleen were found (fig. 4): hyperechogenity 26%, calcifications 18.7%, multiple hypoechogenic lesions in 1 patient with active tuberculosis (fig. 5). Most splenic calcifications (fig. 6) correlate to medical history of tuberculosis (CI [3.93; 18.63]; OR 8.56; p<0.001).

Kidney was echographically normal in 48% patients. Echography of the kidneys showed findings referring to location (ptosis 1.97%), contour (rough surface 5.8%), size and echostructure (fig. 7). Shortening of the kidney’s long axis, size ≤ 100 mm was the most frequent finding in 24% of the patients, all with preserved renal function. The rate of 15.2% lithiasis was significantly higher in HIV patients, compared to the 0.37-5% rate in European general population [6]. Most cases of kidney lithiasis (24/28) were of small size <7mm (fig. 8).

Hydronephrosis (fig. 9) stage I/ II (3.9%) involved big kidney calculus (4/8), but the obstruction was not visible in 4 cases. Echographic diagnosis of the kidney findings without biochemical disorders is difficult, but findings such as: loss of corticomedular differentiation (13.7%), caliceal enlargement (11.7%), cortical calcifications (5%), cortical cysts (1.5%), should suggest nephritic lesions. The length of the antiretroviral experience influenced kidney hypotrophy (p=0.011) and kidney structural findings (KSF) (p<0.001). Tuberculosis was related to KSF findings (p=0.035). Indinavir experience developed related kidney hypotrophy (p<0.001) and KSF (p<0.001).
Pelvic echography was performed only on 70 out of 103 women, because of inappropriate echographic preparation of the urinary bladder. The most useful indication of pelvic echography was pregnancy (19/70), due to the simplicity and accessibility of the method when other pregnancy tests are not available. Ovarian cysts (4/70), polycystic ovary (15/70), uterine fibroma (2/70), intrauterine device (1/70) were associated to recurrence of urinary infections and/or abdominal colic. Frequent ovarian lesions (27%) can be explained by both the young age and endocrine disorders deriving from the HIV infection.

Conclusions

- 89% out of HIV-positive patients had at least one echographic size or structure finding of the liver, spleen or female pelvis.
- Abdominal echography is an effective method for follow up of HIV infection and treatment.

References