A prospective study about the usefulness of ultrasonographic monitoring after invasive liver procedures – liver biopsy and fine-needle aspiration (FNA)


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RESUMEN

Objetivo: establecer si es necesario realizar una ecografía de control a todos los pacientes sometidos a una biopsia hepática o una punción aspiración con aguja fina, para detectar posibles complicaciones con o sin repercusión clínica.

Material y métodos: tras la realización de una biopsia hepática o una punción aspiración con aguja fina según el protocolo habitual, se mantiene al paciente en observación durante 24 horas, realizándose en ese momento una ecografía a todos los pacientes aunque no presenten datos clínicos de complicación.

Resultados: se llevaron a cabo 298 biopsias hepáticas y 98 punciones mediante aguja fina. Presentaron complicaciones un total de 37 pacientes (9,34%), de las cuales 36 (9,09%) fueron complicaciones menores en forma de dolor, síncope vasovagal o hemorragia leve y 1 (0,25%) complicación mayor en forma de hemorragia grave. De las 396 exploraciones tan sólo uno de los casos presentó una complicación detectada en la ecografía (hematoma intraparenquimatoso) encontrándose asintomático.

Conclusiones: la baja incidencia de complicaciones, que cursan de forma asintomática, y la buena evolución de las mismas hacen poco rentable la realización de ecografía de control tras la realización de dichas técnicas diagnósticas, siendo necesaria tan sólo en el caso de sospecha clínica de complicación.


ABSTRACT

Objective: to determine the need to perform ultrasound scans to all patients after liver biopsy or fine-needle aspiration (FNA) in order to detect complications with or without symptoms.

Material and methods: after liver biopsy or FNA using a regular protocol the patient is observed for 24 hours at the hospital, and all patients undergo an abdominal sonography at that time even in the absence of evident complications.

Results: 298 liver biopsies and 98 FNAs were performed. There were complications in 37 patients (9.34%): 36 (9.09%) were minor complications such as pain, vasovagal episodes, or small bleeding, and 1 (0.25%) was a major complication with severe hemorrhage. Only 1 out of all 396 procedures had a complication detected by ultrasounds (intrahepatic hematoma) while the patient was asymptomatic.

Conclusions: the low incidence of complications occurring without symptoms, and their favorable course suggest that routine ultrasonography is not necessary after these techniques, and that it should be only performed when a complication is suspected.

Key words: Liver biopsy. Fine-needle biopsy. Complications. Ultrasound.
lenged and replaced by other alternative procedures. In hepatitis C a histological study helps to assess prognosis and treatment candidacy. However, new serologic tests and other non-invasive procedures are being developed to determine fibrosis extent and replace liver biopsy. In hepatitis B liver biopsy provides some prognostic information, but serologic tests and hepatic biochemical tests are the primary determinants of treatment candidacy. The usefulness of liver biopsy is questionable in non-alcoholic fatty liver disease, as the diagnosis can be accurately reached with other non-invasive procedures and there are no specific therapies available (1).

Nevertheless, both liver biopsy and FNA are two basic tools in the study of liver diseases, and cannot be substituted for at this time. Around 5.9% of these procedures have complications, most of them minor (2). Most important complications include hemorrhage (0.35-0.5% after biopsy and 0.13-2.5% after FNA) (3-6). Different studies have demonstrated that 61% of complications occur during the first 2 hours after the procedure, and 96% within 24 hours (7).

The objective of our study was to establish the need for ultrasound scans to all patients after liver biopsy or FNA, in order to detect complications with or without symptoms.

MATERIAL AND METHODS

We performed a prospective study including 396 patients that were referred to liver biopsy or FNA at the Ultrasound Unit, Gastroenterology Department over a 1-year period—298 liver biopsies and 98 FNAs. They all provided their written informed consent before the procedure. Patients with a platelet count lower than 50,000/mm³ and/or prothrombin activity below 50% of reference value were excluded from the procedure. All procedures were done as per the standard protocol, consisting of more than 6 hours’ fasting, and the administration of atropine 0.5-1 ml subcutaneously just before the procedure. Patients were instructed to stay in hospital for 18 hours after the procedure. Hemodynamic status (blood pressure and heart rate) was controlled every 15 minutes during the first 2 hours, every 30 minutes during the next 2 hours, and afterwards every hour for the following 24 hours.

An ultrasound study was performed to all patients 24 hours after the procedure if they had no symptoms, and urgently if a complication was suspected (blood pressure less than 100 mmHg, severe pain, sickness, nausea or vomiting).

Complications were classified into 2 groups:
1. Minor complications:
   - Pain in the site of puncture or irradiated to the right shoulder without complications in the ultrasound study.
   - Hypotension with normal ultrasounds, considered a vasovagal episode.
   - Hemorrhage without major criteria.
2. Major complications:
   - Hemorrhage (intrahepatic or subcapsular hematoma, or intraperitoneal hemorrhage) requiring transfusion or surgery.
3. Puncture of other viscera.

### RESULTS

There were complications in 37 patients (9.34%).

---Minor complications:
Two patients (0.50%) had a hypotensive episode after their liver biopsy, without anemia and with a normal ultrasound study, due to a vasovagal reaction.

Twenty five (8.38%) patients referred for liver biopsy needed analgesia to control their pain, while only one (1.02%) subjected to FNA had pain requiring analgesia. None of these patients had complications detected by ultrasounds.

A total of 34 patients (8.58%) had pain after the procedure, with 8 (2.02%) of them having a hematoma in their ultrasound scan; the other 26 (6.56%) (25 liver biopsies and 1 FNA) had no complications in their ultrasonograms.

There were 8 (2.02%) minor bleedings (intrahepatic hematoma), 7 (2.34%) after liver biopsy and 1 (0.12%) after FNA. Only one of these patients had no symptoms, while the other presented with abdominal pain without significant hemodynamic compromise. None of them needed blood transfusions, and all cases were solved without surgery. The asymptomatic patient had a 12-mm...
hematoma, while the other patients had hematomas between 8 and 20 mm in size. There was no significant difference in hematoma sizes between asymptomatic and symptomatic patients.

—Major complications:

Only one (0.25%) major complication was recorded that manifested with abdominal pain and hypotension 3 hours after liver biopsy. Ultrasounds detected an intraperitoneal hemorrhage that required 2 blood transfusions, but which solved spontaneously without surgery.

Tackling all ultrasonograms routinely performed into account, among patients with no symptoms only one (0.27%) demonstrated an intrahepatic hematoma, which resolved spontaneously without surgery. In the other 359 patients (99.7%) ultrasonograms did not detect any procedure-related complications.

DISCUSSION

Overall morbidity from liver biopsy or FNA is difficult to ascertain, as most studies are retrospective and therefore do not record symptoms such as pain. In addition, there is no consensus about the classification of complications into minor and major, and it is not clear whether complications such as asymptomatic intrahepatic hematoma should be considered in one of these groups.

In our series the global rate of complications (defined previously) after liver biopsy was 11.7%, with minor complications such as pain in site of puncture, vasovagal episodes, or non-significant hemorrhage being most common.

Pain is the most frequent complication after liver biopsy; according to some authors it develops in 30% of patients, and is moderate and severe in 3% and 1.5%, respectively (8). In our series pain in the site of puncture without ultrasonographic complications is the commonest complication as well, which needed analgesia in 8.9% of patients.

FNA to obtain histological or cytological material is an extended procedure in the diagnosis of focal liver lesions, specially regarding hepatocarcinoma. It is a sensible and specific technique, but it is not exempt of complications. The hemorrhagic rate reported after FNA is 0.13-2.5% (5,6).

Another serious complication after FNA for malignant lesions is the risk of tumor seeding in the needle track. The real incidence of this complication is unknown, but some series estimate the risk of tumor seeding around 0.006% (9).

In our case this complication was not taken into account, as it generally appears several months or even years after the procedure, and that was not the goal of our study (10).

In our series the global rate of complications after FNA was 2.04%, with all cases being included within the minor complications group (1 intrahepatic hematoma and 1 patient who required analgesia with no ultrasonographic complications).

Most important complications are hemorrhagic events. Bleeding rates are very variable according to various authors, and they depend on some important factors such as presence of cirrhosis, fulminant acute hepatitis, treatment with corticosteroids, infection, coagulopathy, heparin injection before biopsy, and chronic renal insufficiency (11, 12). The number of studies is inadequate to demonstrate a reduction of complications depending on patient posture after biopsy, type of analgesia used, or the use of substances to seal the needle track such as fibrin-glue (Tissucol®) (13,14).

In the literature the overall rate of significant hemorrhage is 0.5% of procedures (4). However, the presence of subclinical bleeding, including intrahepatic or subcapsular hematomas, occurs in a much higher percentage of patients, and is detected by ultrasounds routinely performed at 24 hours after the technique.

In this way, it is important to determine what is the real clinical significance of this type of bleeding, and what is the percentage of patients who exhibit suspicion-rising symptoms. These are important data to establish whether sonographic monitoring is necessary for all patients undergoing an invasive hepatic procedure, which would raise healthcare costs and represent an excessive work load for ultrasonography units.

Studies have demonstrated that 20% of liver biopsies result in an intrahepatic or subcapsular hematoma −16.7% of them without any symptoms, and only 1.7% associated with symptoms that may suggest a complication (15). In other studies this rate is much lower —7% with radionuclide scans (16), and 3.3% when computed tomography studies (without contrast) are used (17).

In our series 2.27% of the procedures (liver biopsy and FNA) had a hemorrhagic complication, 8 of them in the form of intrahepatic hematoma. Taking all 396 explorations into account, only in one case did the patient have an ecographic complication while remaining asymptomatic. This complication was an intrahepatic hematoma, 12 mm in size.

The low incidence of severe complications, and their good prognosis suggest that routine ultrasounds for all patients after liver biopsy or FNA represents a cost-ineffective intervention, and that this procedure is only necessary when a complication is suspected (hypotension, severe pain, or anemia).

REFERENCES

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