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Safety and clinical implications of concurrent biopsy of neuroendocrine liver metastases at the time of liver-directed therapy

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BACKGROUND

Neuroendocrine tumor liver metastases (NETLMs) significantly affect patient prognosis. Tumor grade informs treatment and may evolve over time, suggesting a role for serial biopsy. As part of an ongoing prospective clinical research study, we obtained research and clinical biopsy samples of NETLMs at the time of liver-directed therapy (LDT). This study evaluates the safety of concurrent biopsy, determines the frequency of grade change compared to prior tissue samples, and assesses whether such results altered patient management.

METHODS

Patients with clinically diagnosed NETLMs were enrolled in a prospective cohort study for genetic, proteomic and metabolic characterisation of NETLMs at a single academic center from 2016-2024 (IRB#825782). 18G core biopsies were obtained using coaxial technique at the time of LDT. Primary outcomes included adverse event (AE) rates, using Society of Interventional Radiology guideline definitions. AEs requiring additional intervention and/or hospitalization were grouped as ‘major” and those requiring no therapy/receiving nominal therapy grouped as “minor”. Secondary outcomes included tumor grade change between biopsy samples and prior tissue samples and alterations in clinical management based on these results. Potential associations between clinical characteristics (biopsy location, number of cores, etc) and AEs were assessed by univariate analyses. Significance was set at $p<0.05$.

RESULTS

Eighty-seven biopsies were performed in 77 patients were included in the primary analysis. The diagnostic biopsy rate was 92% (80/87). A mean of 8 core biopsies (SD 1.76) were taken from the same lesion per procedure. The median interval between baseline and research biopsy was 1.7 (IQR 0.7-3.6) years. Biopsy-related AEs occurred in 8% of cases (7/87); Major AEs occurred in 2% (2/87)

and included: 1) an arterioportal/arteriobiliary fistula resulting in hemobilia and a main portal vein thrombosis (PVT), and 2) perihepatic bleeding requiring an additional embolization procedure. Both patients fully recovered. Minor AEs included asymptomatic arterioportal (n=1) and arteriovenous (n=1) fistulas, subcapsular/perihepatic hematoma (n=2), and segmental PVT (n=1). No significant associations between AEs and clinical characteristics were identified. Among 63 patients eligible for grade change analysis, 27 (43%) exhibited a change in tumor grade: 8 (13%) decreased and 18 (30%) increased. Seven of 18 patients (39%) with increased grade consequently underwent changes in clinical management.

CONCLUSIONS

Concurrent biopsy of NETLMs at the time of LDT has an acceptable AE rate and yielded clinically actionable information regarding grade change in a significant proportion of patients. These findings suggest concurrent biopsy at the time of LDT should be considered in those lacking recent tissue sampling.

ABSTRACT ID 33410