



Title	Surveillance of Cirrhosis for Hepatocellular Carcinoma: Systematic Review and Economic Analysis
Agency	NETSCC, HTA, NIHR Evaluation and Trials Coordinating Centre Alpha House, University of Southampton Science Park, Southampton, SO16 7NS, United Kingdom; Tel: +44 2380 595 586, Fax: +44 2380 595 639; hta@soton.ac.uk , www.hta.ac.uk
Reference	Volume 11.34. ISSN 1366-5278. www.hta.ac.uk/project/1494.asp

Aim

To evaluate the effectiveness, cost effectiveness, and cost utility of surveillance of patients with cirrhosis (alcoholic liver disease [ALD], hepatitis B [HBV], and C virus [HCV]) using periodic serum alpha-fetoprotein (AFP) testing and/or liver ultrasound examination to detect hepatocellular carcinoma (HCC), followed by treatment with liver transplantation or resection, where appropriate.

Conclusions and results

No studies were identified that met the criteria of the systematic review. Based on the assumptions used in the model, the most effective surveillance strategy uses a combination of AFP testing and ultrasound at 6-month intervals. Compared with no surveillance, this strategy is estimated to more than triple the number of people with operable HCC tumors at time of diagnosis, and almost halves the number of deaths from HCC. On all effectiveness measures and at both testing frequencies, AFP- and ultrasound-led surveillance strategies are similar. This may be because test sensitivity varied according to tumor size, which means that AFP testing is capable of identifying many more small tumors than ultrasound. The best available evidence suggests that AFP tests will detect approximately six times as many small tumors as ultrasound. Increasing the frequency of either test to 6-month intervals is more effective than performing combined testing on an annual basis. The undiscounted lifetime cost of the surveillance strategies, including all care and treatment costs, ranges from 40 300 pounds sterling (GBP) (annual AFP triage) to GBP 42 900 (6-month AFP and ultrasound). The equivalent discounted costs are GBP 28 400 and GBP 30 400. Only a small proportion of these total costs results from the cost of the screening tests. However, screening test costs, and the cost of liver transplants and caring for people post-transplant, accounted for most of the incremental cost differences between alternative surveillance strategies. The results suggest that different surveillance strategies may provide the best value for

money in patient groups of different cirrhosis etiologies. Surveillance in people with HBV-related cirrhosis for HCC provides the best value for money, while surveillance in people with ALD-related cirrhosis provides the poorest value for money. In people with HBV-related cirrhosis, at an assumed maximum willingness to pay (WTP) for a quality-adjusted life-year (QALY) of GBP 30 000, both the deterministic and probabilistic cost-utility analyses suggest the optimal surveillance strategy would be 6-month surveillance with the combination of AFP testing and ultrasound. See Executive Summary link at www.hta.ac.uk/project/1494.asp.

Recommendations

In a mixed etiology cohort, the most effective surveillance strategy is to screen each. This may be largely due to the younger age at diagnosis of cirrhosis in patients with HBV. This raises the possibility of further subgroups of ALD and HCV patients diagnosed with cirrhosis at a younger age, in which more intensive surveillance might provide value for money. *Implications for policy:* The results show that surveillance strategies for HCC are effective and can often be considered cost effective in patients with cirrhosis. We believe that the implementation of formal surveillance programs should be considered where they do not currently exist. See Executive Summary link at www.hta.ac.uk/project/1494.asp.

Methods

See Executive Summary link at www.hta.ac.uk/project/1494.asp.

Further research/reviews required

See Executive Summary link at www.hta.ac.uk/project/1494.asp.