US LI-RADS: impact of implementing a standardised reporting template for HCC surveillance.

Samira Drees Clinical Lead Sonographer
Ruth Reeve Clinical Specialist GI Sonographer

Objectives

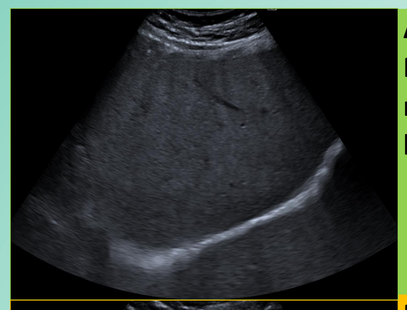
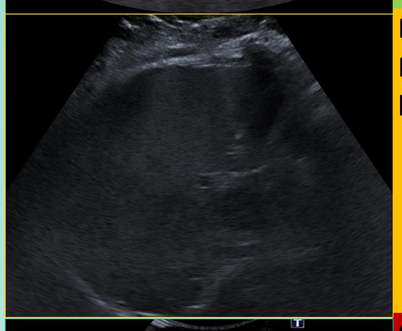
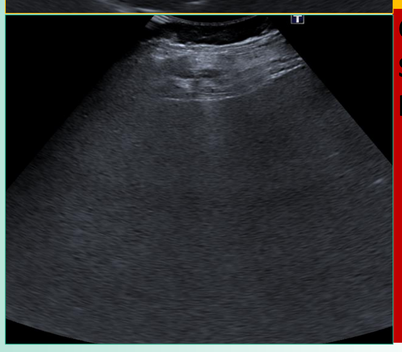
Outline Ultrasound Liver Imaging Reporting and Data Systems (US LI-RADS).
Review the impact of introducing US LI-RADS on reporting and imaging of HCC surveillance and management of new observations in patients at risk of HCC.

US LI-RADS

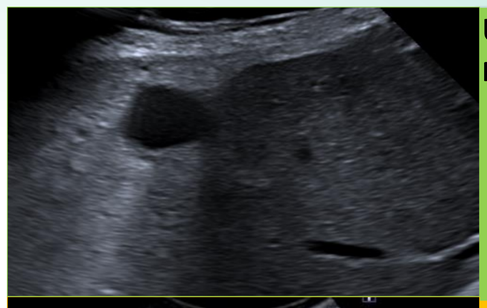
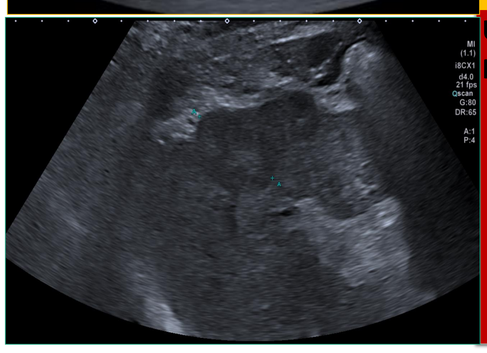
US LI-RADS is a standardized system for imaging technique, interpretation, reporting and data collection for surveillance ultrasound in patients at risk for developing HCC, composed of categorisation and scoring of visualisation & observations to direct further management.

System aims to improve communication, patient care, education, and research by including controlled terminology, an illustrative atlas, reporting guidelines and education material.

Visualisation scoring reflects technical or other factors that may affect liver visualization or nodule detection. Three scores are possible: A, B or C.

	**A. No or minimal limitations**	Limitations if any are unlikely to meaningfully affect sensitivity	Liver homogeneous or minimally heterogeneous Minimal beam attenuation or shadowing Liver visualized in near entirety
	**B. Moderate limitations**	Limitations may obscure small masses	Liver moderately heterogeneous Moderate beam attenuation or shadowing Some portions of liver or diaphragm not visualized
	**C. Severe limitations**	Limitations significantly lower sensitivity for focal liver lesions	Liver severely heterogeneous Severe beam attenuation or shadowing Majority (>50%) of liver not visualized Majority (>50%) of diaphragm not visualized

Observation scoring summarises the main results and helps determine the most appropriate follow-up. Three scores are possible: US-1, US-2 and US-3.

	**US-1 Negative**	No US evidence of HCC	No observation OR Only definitely benign observation(s)
	**US-2 Subthreshold**	Observation(s) detected that may warrant short-term (3 month) US surveillance	Observation(s) < 10 mm in diameter, not definitely benign
	**US-3 Positive**	Observation(s) detected that may warrant multiphase contrast-enhanced imaging	Observation(s) ≥ 10 mm in diameter, not definitely benign OR New thrombus in vein

Methods

Quality improvement methodology was utilised to implement US LI-RADS protocols into a single NHS trust, using audits to monitor application and outcomes. Implementation of US LI-RADS was complemented through the model for improvement's Plan-Do-Study-Act (PDSA) cycles, reviewing acceptability/barriers during implementation. Retrospective audits were conducted.

1. Firstly an initial review following introduction of US LI-RADS was performed to identify the acceptability and compliance of new guidance.
2. Later an audit on outcomes was conducted to determine the temporal evolution and diagnostic accuracy of US-2 and US-3 observations on US LI-RADS to ensure no HCC missed due to LI-RADS reporting

Results

1 Acceptability & Compliance

105 US scans in 2019 reviewed

US LI-RADS reporting was correctly used 85%

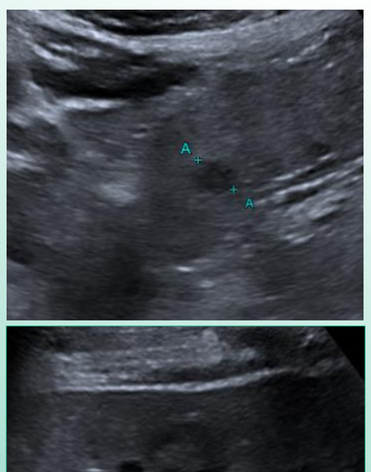
Correct images recorded in 100% of examinations.

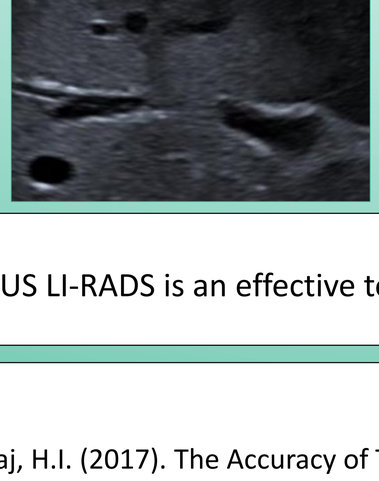
Non-use of US LI-RADS reporting was identified in non-permanent staff.

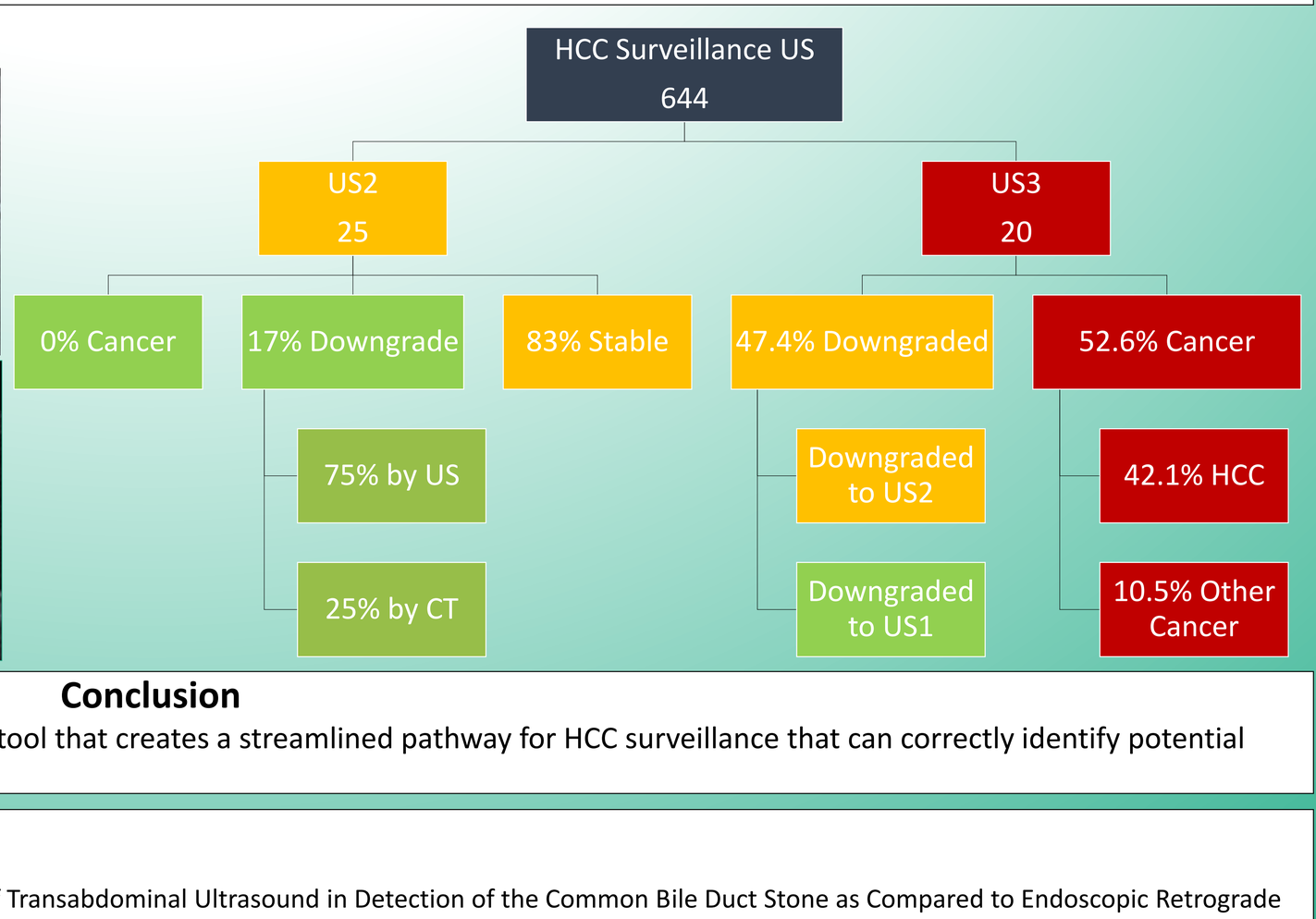
Improvement plan in place for further staff training and monitoring/audit.

2 Temporal evolution & Diagnostic Accuracy of US-2 & US-3

644 ultrasound reports over a 6-month period were reviewed in 2022, 45 reported abnormal findings (US2/3 scores). No US2 lesions progressed to HCC. 52.6 % of US3 lesions were confirmed as cancer (42.1% as HCC, 10.5% other cancers), the remaining 47.4 % were downgraded following cross-sectional radiology (CT/MRI). Use of US LI-RADS ultrasound surveillance of US2 lesions reduced the demand on cross-sectional radiology. Using US surveillance of US2 lesions, 82% were stable on ultrasound during the review period and 18% of US2's downgraded to US1 (benign) using CT in just 1 case.







Conclusion

US LI-RADS is well accepted by the radiology team. US LI-RADS is an effective tool that creates a streamlined pathway for HCC surveillance that can correctly identify potential HCC.

References

Alkarboly, T.A.M., Fatih, S.M., Hussein, H.A., Ali, T.M. & Faraj, H.I. (2017). The Accuracy of Transabdominal Ultrasound in Detection of the Common Bile Duct Stone as Compared to Endoscopic Retrograde Cholangiopancreatography (with Literature Review). Open Journal of Gastroenterology, 6(10).

Williams, E., Beckingham, I., El Sayed, G., Gurusamy, K., Sturgess, R., Webster, G. & Young, T. (2017). Updated guideline on the management of common bile duct stones (CBDS). Gut, 66(5), 765-782.