

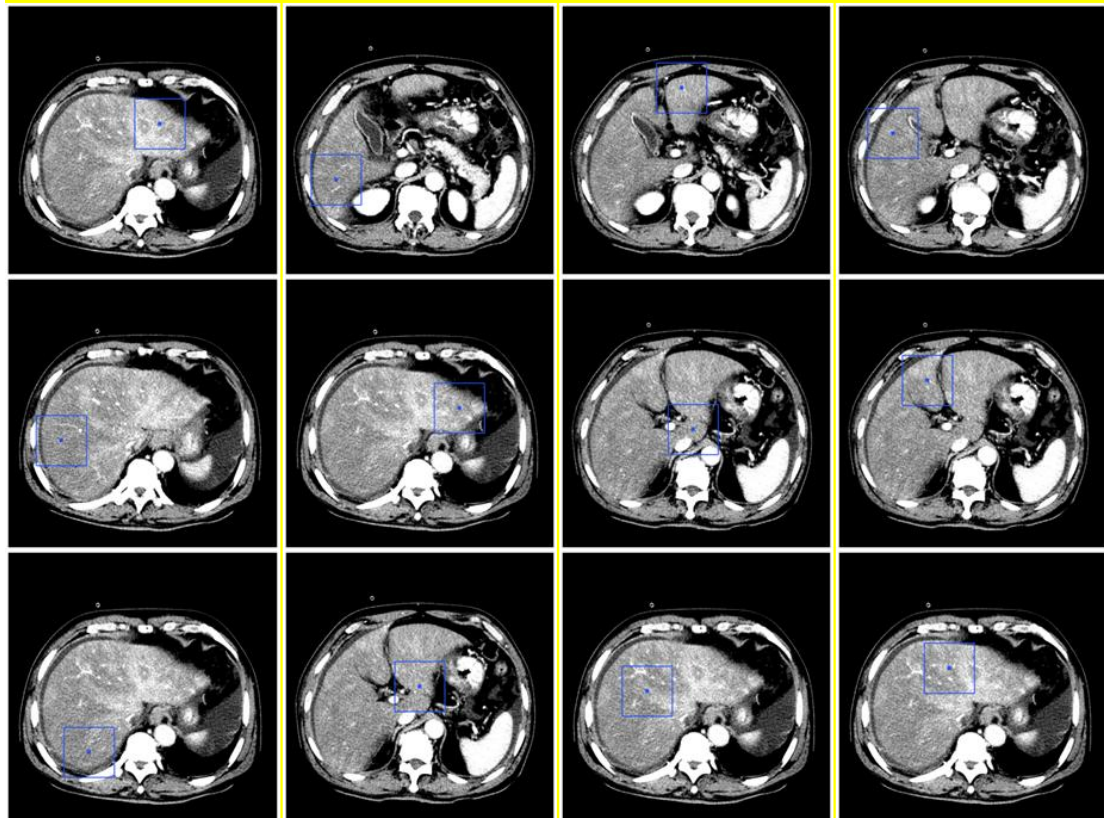
Block 64

Block 96

Block 128

Block 160

(a) Visualization of ROI blocks of different sizes



(b) ROI sampling (Block size 96)

Figure S1 Visualization of preprocessed image and ROI. The square represents the ROI which centered at the annotation point.

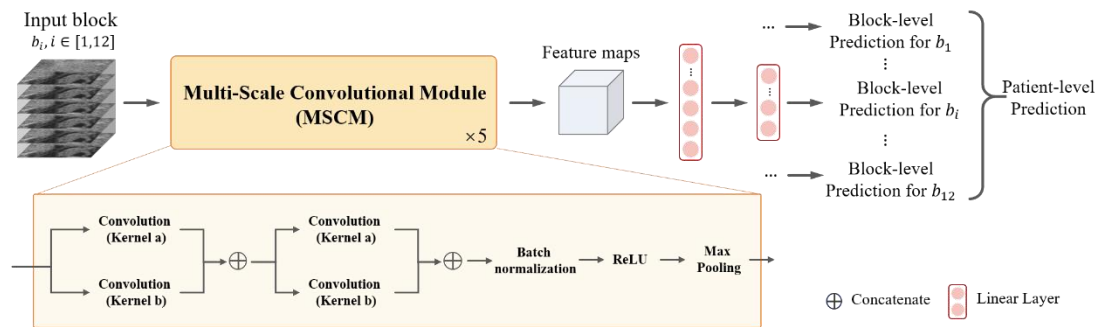


Figure S2 The overview of the deep learning-based diagnostic model. Each multi-scale convolutional module uses convolution kernels of different sizes (3 and 5, respectively) to extract image features, after which the outputs are concatenated along the channel dimension. This process is repeated once more to achieve the goal of extracting and integrating information across multiple scales, further improving the performance of the classification model.



Figure S3 Visualization of the original images and corresponding segmentation

results. The four columns present the original image, the normalized image, the segmentation mask, and the segmentation mask overlaid on the image, respectively.

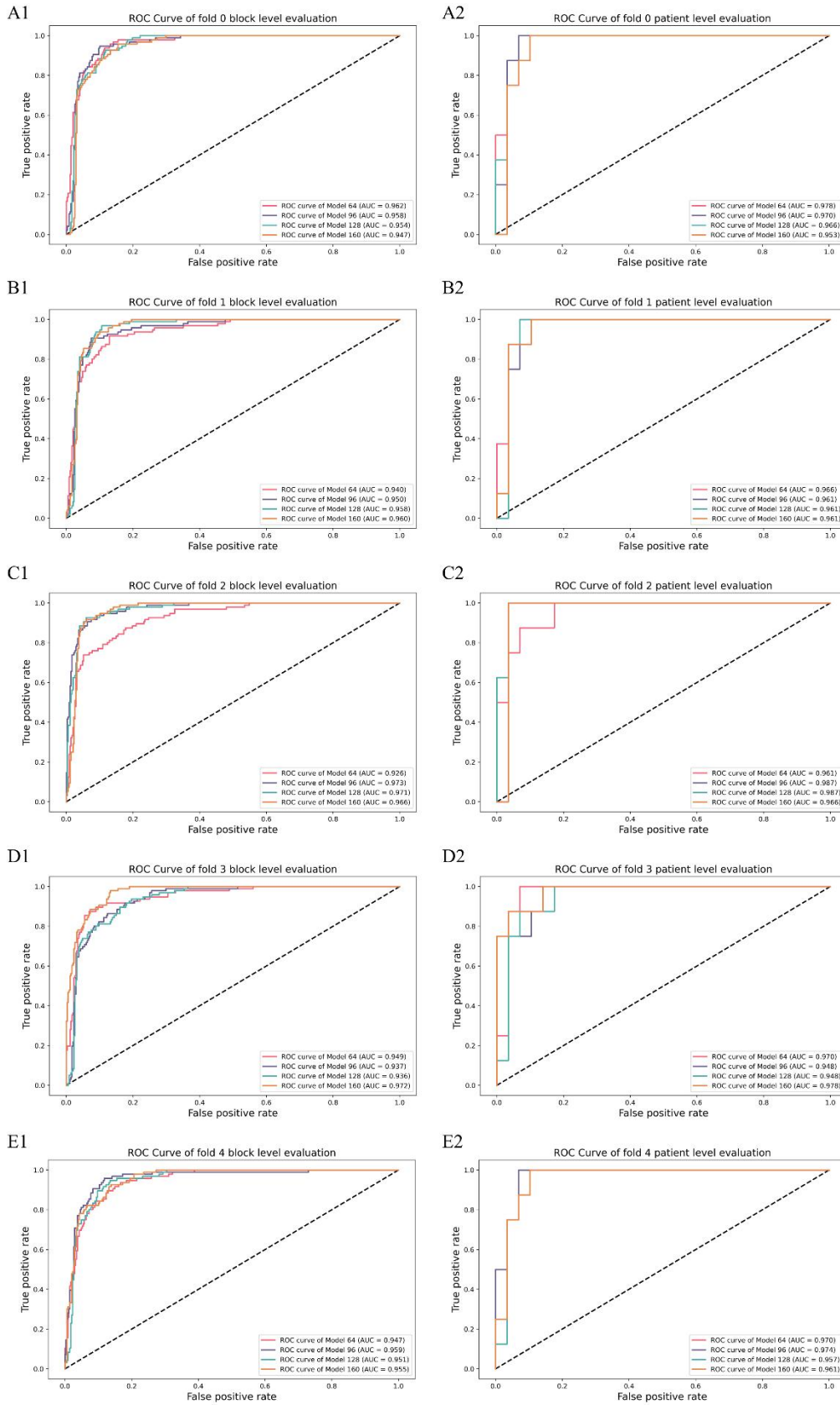


Figure S4 ROC curve of the cross-validation models. ROC curves and corresponding AUC values plotted on the test set based on the prediction results of

each fold model at four input sizes of 64mm, 96mm, 128mm, and 160mm, respectively. The left column (A1-E1) is at the block level and the right column (A2-E2) is at the patient level.

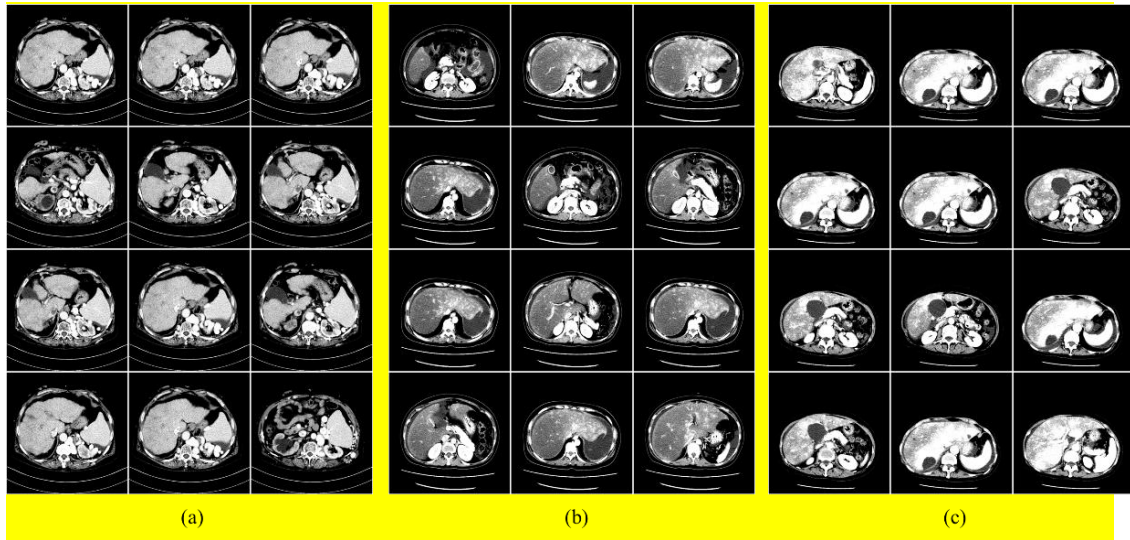


Figure S5 Examples of misclassified cases by the deep learning diagnostic model.

(a, b) Two Budd–Chiari syndrome patients that the model incorrectly predicted as high-risk PA-HSOS. (c) A PA-HSOS patient that was incorrectly predicted as non-PA-HSOS (low risk) by the model.

Table S1 Patient-level ablation result of the key components in proposed model on the internal test cohort.

Model	AUC	ACC	SEN	SPE
W/o auto-segmentation	0.922	0.865	0.875	0.862
W/o multi-scale convolution	0.940	0.865	0.875	0.862
W/o using annotation for sampling	0.853	0.919	0.750	0.966
Model 96	0.944	0.865	0.875	0.862

AUC: area under the receiver operating characteristic curve, ACC: accuracy, SEN: sensitivity, SPE: specificity