Additional file 1: Figure S1 Illustration of the influence of logistic model parameters on curve, and the model fitted to a CKC. From left to right: α defines the asymmetry of the logistic model, τ the steepness of the curve and *k* influences the terminal slope. The regression curve fitted to a given CKC for a malignant (blue) and a benign lesion (green).



Figure S2 Boxplot of automatic segmentation performance in terms of Dice similarity coefficient (DSC). DWI, diffusion-weighted imaging; GI, Gini Importance; mRMR, minimum-Redundancy-Maximum-Relevance; PET, positron emission tomography; w/o, without

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Table S1Definitions of morphologic features.

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| **Morphological feature**  | **Definition**  | **Note** |
| Number of voxels in the lesion ($n$) = Volume of lesion ($V$) |  $n=|x\_{l}|$  | Number of voxels and volume were the same in this case since a voxel had a volume of 1 mm$ ^{3}$. |
| Centroid ($\overbar{c}$)  | $\overbar{c}=\frac{1}{n}\sum\_{n}^{}‍x\_{i}$, with $x\_{i}\in x\_{l}$ |
| Maximum radial distance ($r$) |  $r=max\_{x\_{i}\in x\_{l}}(||x\_{i}-\overbar{c}||)$ |
| Normalized radial length ($nrl$) |  $nrl\_{i}=\frac{||x\_{i}-\overbar{c}||}{r}$, with $x\_{i}\in x\_{l}$ |
| Area of enclosing surface ($A$) |  $|voxel surface faces|$ |
| Volume Overlap Ratio ($VOR$) |  $\frac{V}{4/3π r^{3}}$  | Ratio of lesion volume to circumscribing sphere.  |
| Elliptic Volume Overlap Ratio ($EllVOR$) |  $\frac{V}{4/3π a b c}$ | Ratio of lesion volume to inertia ellipsoid. $a,b,c$...ellipsoid radii. The inertia ellipsoid is obtained by PCA of $x\_{l}$.  |
| Discrete Compactness ($C\_{d}$) 52  |  $\frac{n-A/6}{n-(\sqrt[3]{n})^{2}}$  |   |
| Irregularity ($Irr$) |  $1-\frac{π\*d\_{e}^{2}}{A}$, with $d\_{e}=2\sqrt[3]{\frac{3V}{4π}}$  | Deviation of lesion surface $A$ from a sphere surface with the same volume. |
| Sphericity ($S$)  |  $\frac{min\_{x\_{i}\in x\_{l}}(||x\_{i}-\overbar{c}||)}{r}$ |  Ratio of inscribing sphere radius to circumscribing sphere. |
| NRL mean ($μ\_{nrl}$) |  $1/n\sum\_{n}^{}‍nrl\_{i}$ |  |
| NRL variance ($σ\_{nrl}^{2}$) | $$1/n\sum\_{n}^{}‍(nrl\_{i}-μ\_{nrl})^{2}$$ |  |
| NRL sphericity ($S\_{nrl}$) |  $\frac{μ\_{nrl\_{i}}}{σ\_{nrl}^{2}}$ |  |