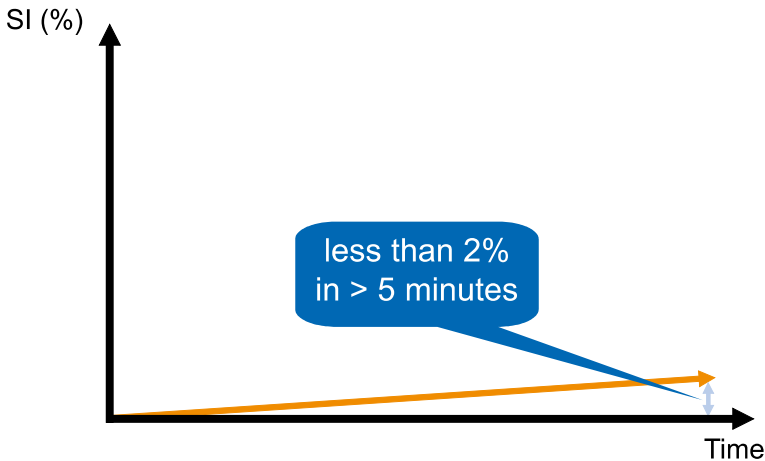


### Definition

MRI signal intensity increases by less than 2% after the injection of 0.1 mmol/kg body weight gadolinium-DTPA or a similar contrast agent during the first 90 seconds after contrast injection and also within the first 7 minutes.

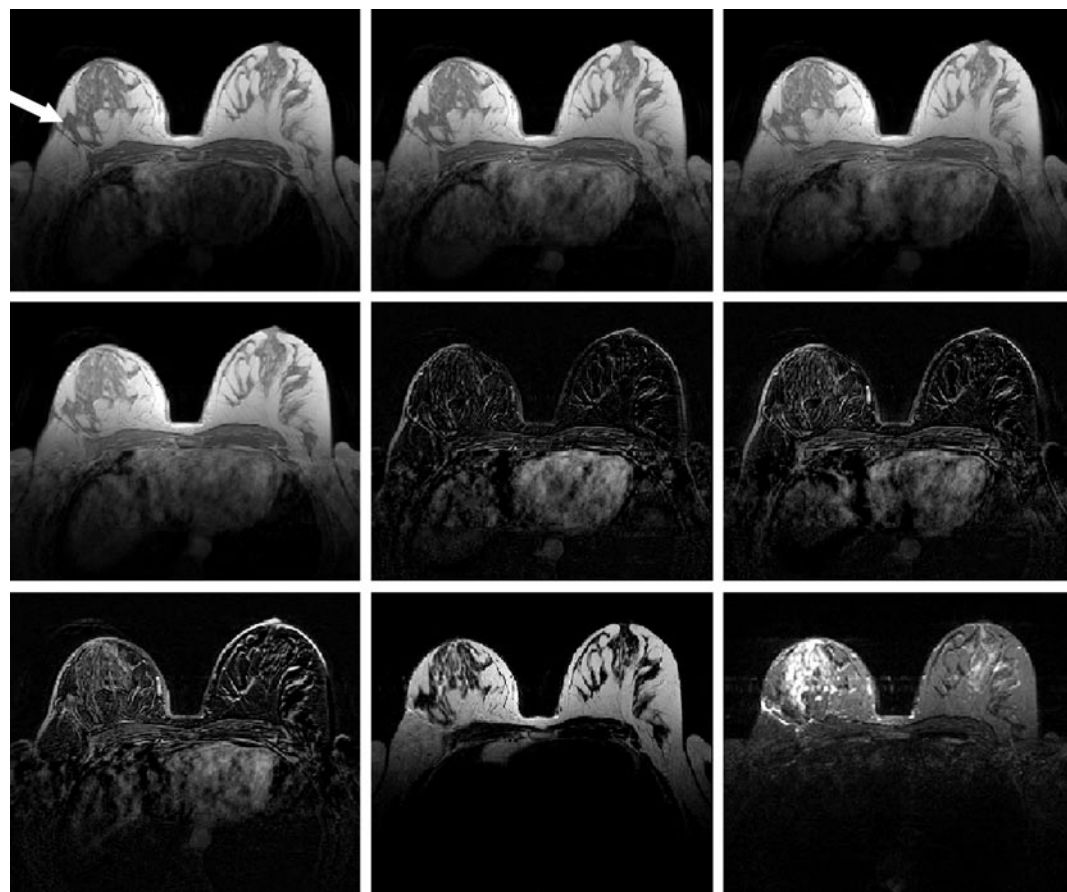
### Diagram



### Interpretation to the Examples

Sign 1 basically describes the response of normal, nonstimulated breast parenchyma to intravenous contrast administration. It can also be seen in scar tissue that is more than 6 months old. Basically this sign is a very strong indicator of a benign condition (adenosis, fibrous fibroadenoma, scar, fat necrosis, etc.). It should be noted, however, that this sign may also occur in malignant lesions following a technically flawed or inadequate contrast injection or if the patient has received chemotherapy in the recent past (i.e., weeks or months before the examination). It should be easy to identify these mitigating factors, however, and therefore sign 1 is considered a very strong indicator of benignancy.

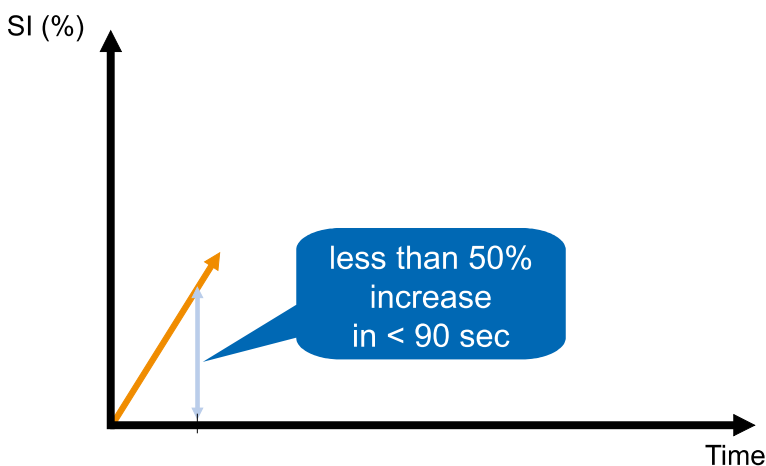
## Examples



### Definition

("Wash-in" describes the maximum rise of signal intensity that occurs during the first 90 seconds after the injection of 0.1 mmol/kg body weight gadolinium-DTPA or a similar contrast agent.) In cases with slow wash-in, the MRI signal intensity increases by less than 50% over the precontrast signal intensity within 90 seconds after injection of the contrast agent.

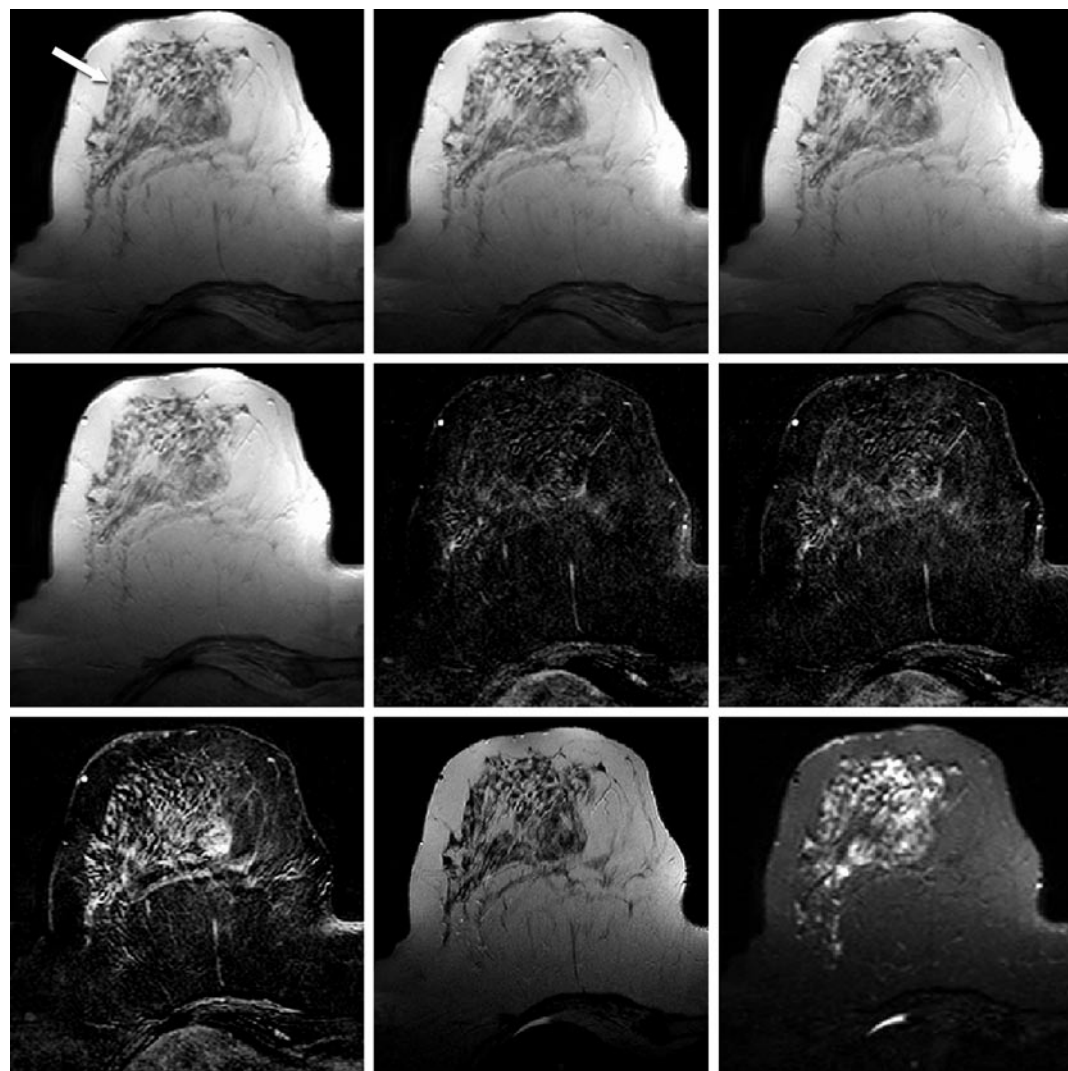
### Diagram



### Interpretation to the Examples

Sign 2 basically describes a slow rate of initial contrast enhancement. This pattern is typically seen in fibrous fibroadenomas, scars, and foci of adenosis. Hormonal effects relating to the normal menstrual cycle may cause a 10% to 20% change in this sign, with less enhancement occurring during the initial phase of the cycle and greater enhancement occurring during the second half of the cycle. The presence of sign 2 in a mass lesion most likely indicates a fibrous fibroadenoma or a scar. The presence of this sign in a non-mass lesion indicates either normal parenchyma, fibrosis, or mild inflammation (mastitis). Very rarely, carcinoma in situ may also display this sign, in which case the enhancement is asymmetrical and unilateral. It should be noted, however, that gradual enhancement may occur in carcinomas as a result of incomplete contrast injection, excessive compression, or chemotherapy in the recent past. It should also be noted that sign 2 depends strongly on the type of contrast agent that is used. An intravascular macromolecular contrast agent will have different wash-in characteristics than a smaller amount of extravascular contrast agent that can enter the interstitial space. Basically, however, sign 2 is considered a strong indicator of a benign lesion.

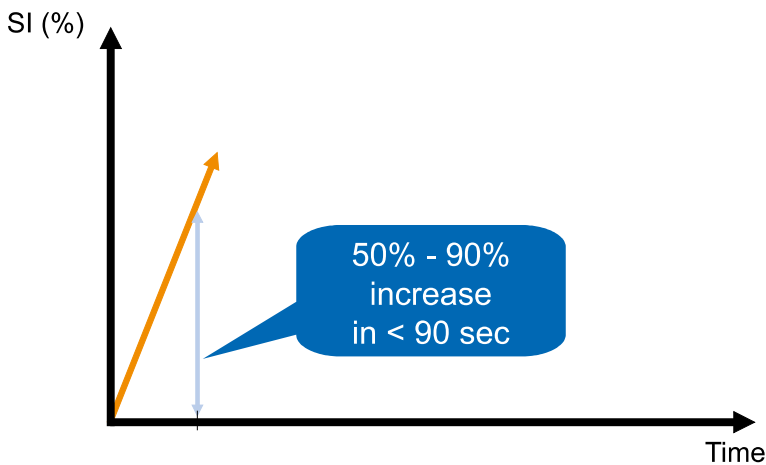
## Examples



### Definition

(“Wash-in” describes the maximum rise of signal intensity that occurs during the first 90 seconds after the injection of 0.1 mmol/kg body weight gadolinium-DTPA or a similar contrast agent.) Signal intensity increases by 50% to 90% over the precontrast level within 90 seconds after injection of the contrast agent.

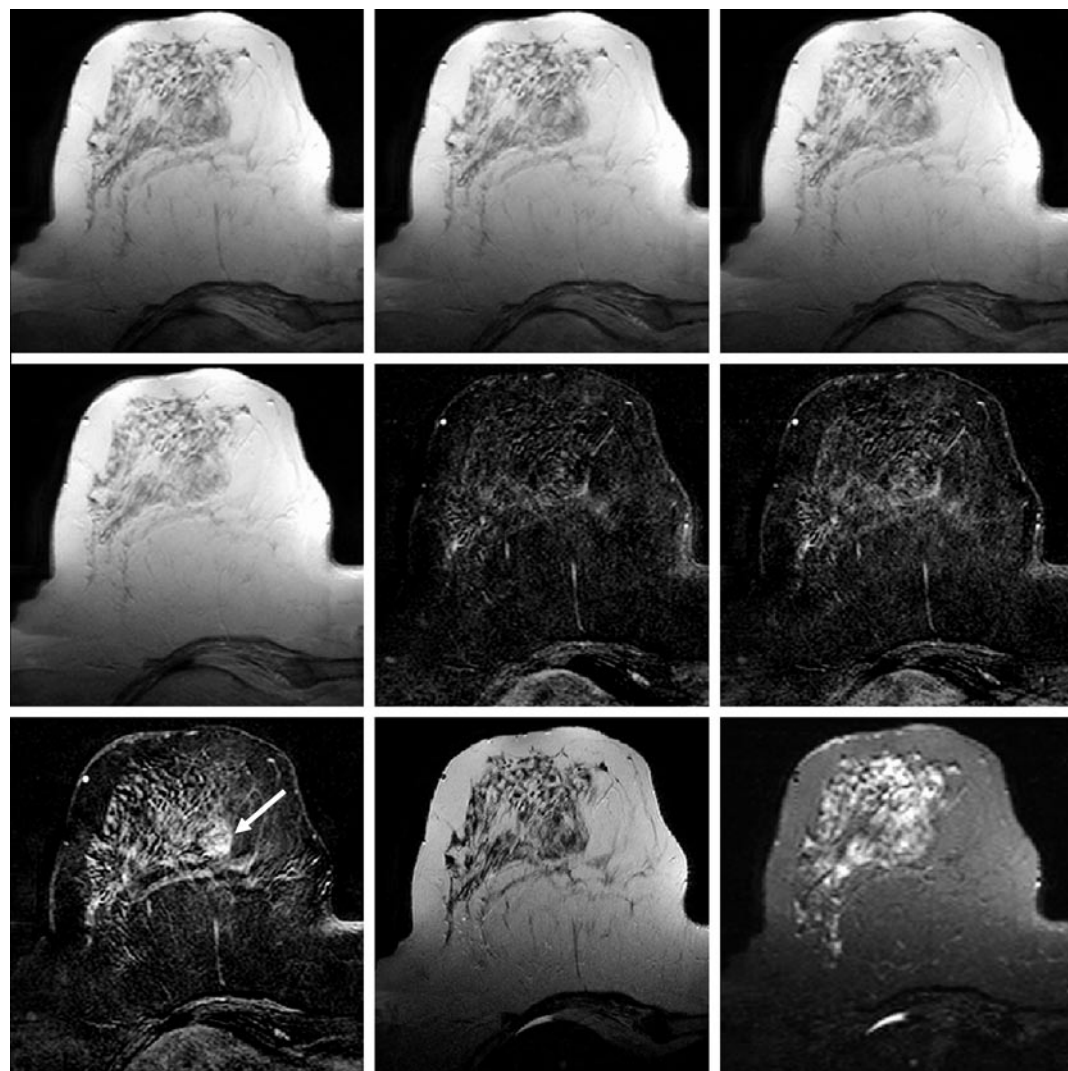
### Diagram



### Interpretation to the Examples

The moderately intense initial enhancement of a mass lesion is most commonly seen in a fibroadenoma or papilloma. Less frequently it occurs in carcinomas after chemotherapy. Medium wash-in occurring in a non-mass lesion may indicate mastitis, a fresh scar, or a hormonal effect. If sign 3 is combined with a unilateral reticular dendritic pattern of enhancement, the lesion may be DCIS or an intralobular carcinoma with reticular growth.

## Examples



Signs in MR-Mammography

Kaiser, W.A.

2008, XIV, 386 p., Hardcover

ISBN: 978-3-540-73292-1