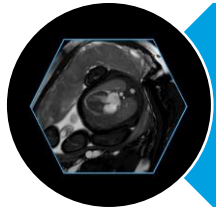


# Section 3 - How to adapt sequences and optimize images



**3.1 BFFE Cine Setup**



**3.2 Flow quantification**



**3.3 Tips & tricks and Challenges**



**3.4 Common pitfalls and artifacts**



# Common pitfalls and artifacts

## 1. Artifacts: How to avoid them

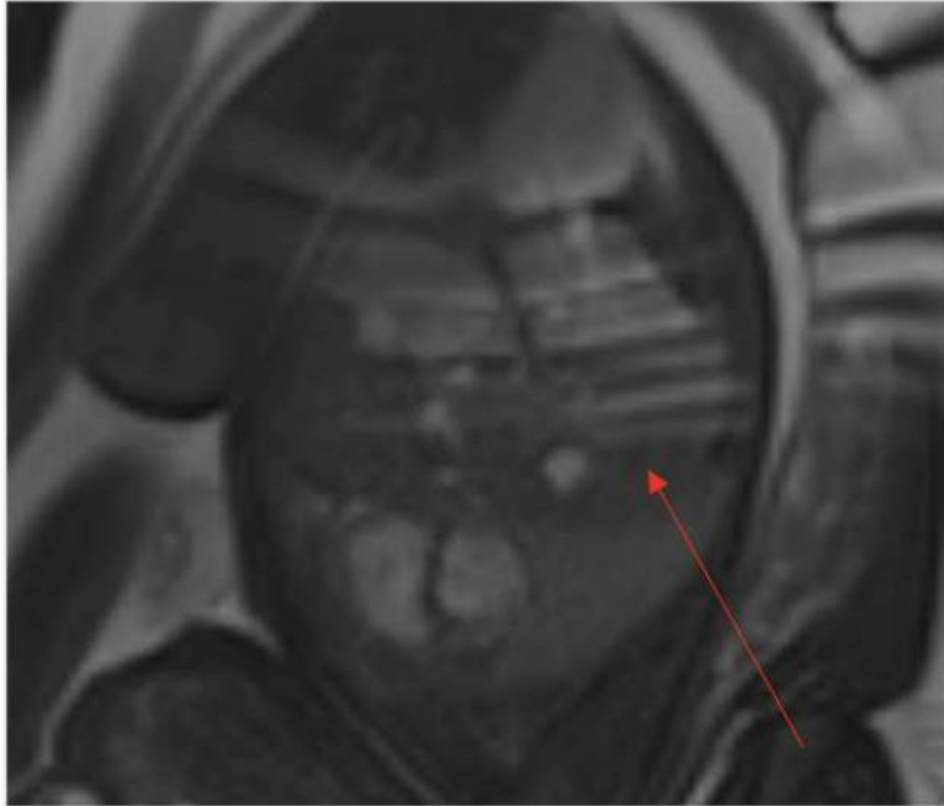
**Aim:** follow the tips below if you come across one of these cases.

- **Susceptibility artifact (black bands)**
  - Black band artifacts appear in regions where signals are de-phased
    - Use volume shim for optimal homogeneity in the region of interest
    - Use shortest TR which results in less time for de-phasing
- **Accelerating flow artifacts**
  - Cine is sensitive to accelerating flow. Ghost artifact from large vessels outside shim volume can occur.
    - Include large vessels in shim volume





- **Wrapping artifact (fold-over, back-folding, phase wrap)**
  - Cause: Tissue outside FOV in fold-over (phase) direction (see image below).



How to avoid the it?

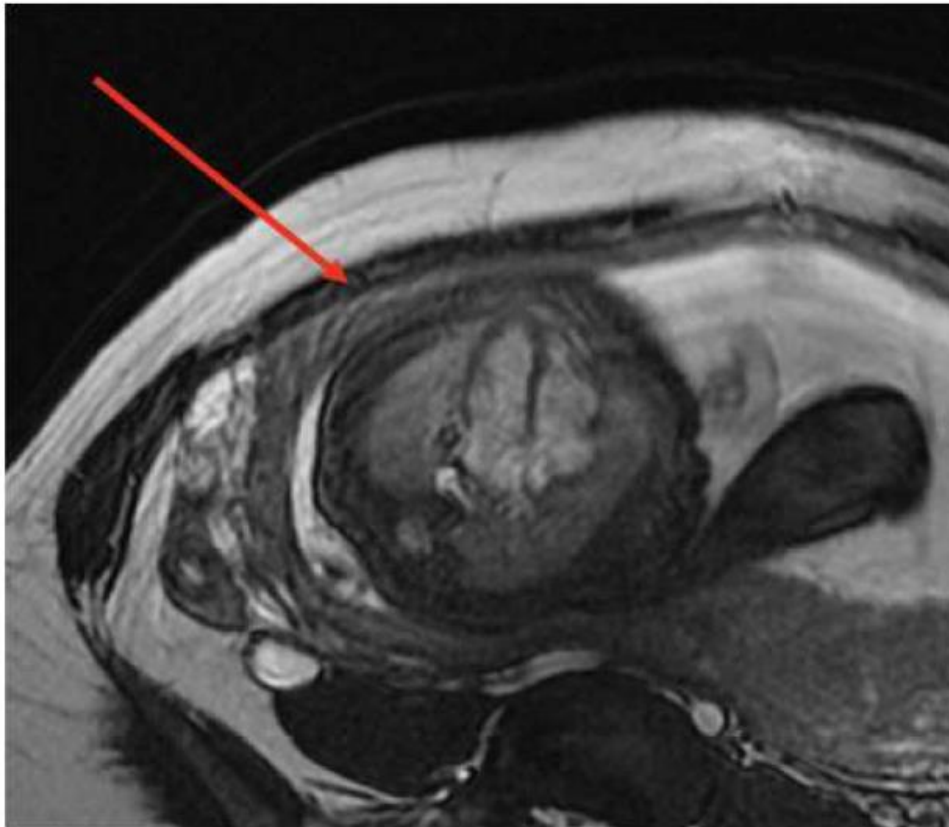
- ***Increase FOV in the foldover direction.***
- ***Add phase encoding steps (phase-oversampling, fold over suppression, no phase wrap).***
- ***Swap/change phase and frequency direction.***





- **Ghosting Artifact from motion (respiratory)**

- Cause: Maternal breathing artifacts can affect fetal cmr scans, so the mother is asked to hold her breath during Cine sequences BH and to breathe shallowly to reduce movement and prevent heartbeat interruptions during Free Breathing sequences.



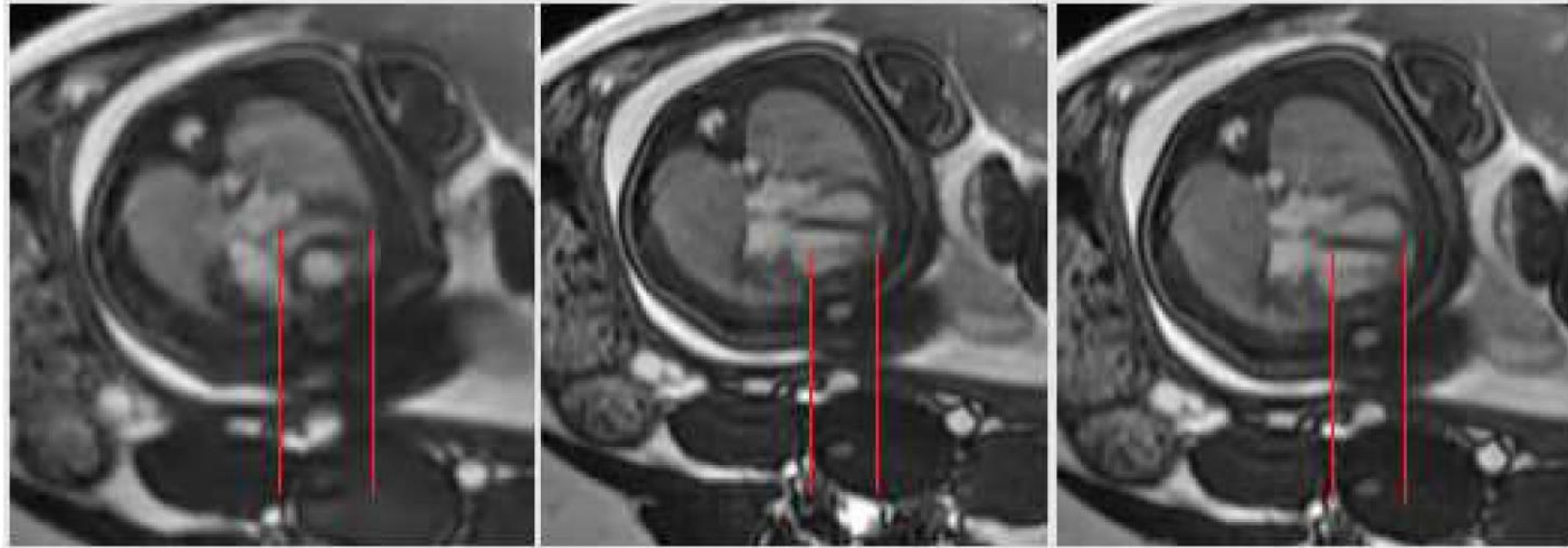
How to avoid it?

- ***Clear and important breath-holding & Free Breathing instructions.***
- ***Swap/change phase and frequency direction.***
- ***Use acceleration techniques***





- **Ghosting Ghosting Artefact from motion (pulsatile flow)**
  - Note: The overlapping vase is visible inside the parallel red lines below.



How to avoid it?

- ***Use flow compensation.***
- ***Swap/change phase and frequency direction.***