MRI of Fistula In Ano
Objectives

- To understand how radiologists perform, interpret and report fistula MRI
- To learn MRI signs of disease activity and implications of MR findings in surgical treatment planning
Problems surgeons encounter...

- The current Gold Standard is surgical assessment
- Examination under Anaesthesia (EUA)
- This isn’t perfect...
Problems surgeons encounter…

1. don’t appreciate the fistula course
2. fail to appreciate complex features
   - pockets of undrained sepsis
   - fail to recognise complications

How does MRI influence outcome…?
What do we know? Recurrent disease

**Recurrent fistula in ano**

- Surgeon **always** acts on MRI results
  - recurrence rate = 16%
- Surgeon **never** acts on MRI results
  - recurrence rate = 57%

Surgery guided by MRI reduces further recurrence by **75%**

BUCHANAN Lancet 2002
What do Surgical guidelines say?


- **MRI** should be considered in any primary fistula deemed after clinical or endosonographic assessment to be complex
- Should also be considered in patients with recurrent anal fistula
- **MRI** is superior to ultrasound

*(Association of ColoProctologists of Great Britain and Ireland)*
Understanding fistulas

- How do we do our MRI?
MRI Hardware requirements

1.5T MRI

- Multichannel surface coil
- Endoluminal (anal) coil unnecessary
MRI Technique

Imaging planes

- **Axial** - relationship to sphincters
- **Coronal** - level of internal opening & relationship to levator ani muscles

**Sagittal** sometimes useful (e.g. anovaginal fistula)
MRI Orientation

Foreshortening without oblique

True height with oblique coronal
MRI Sequence selection

Personal preference
‘Fistula scan’ (3-5mm slice thickness)

Choices –

- STIR
- T2 with fat saturation
- T1 with fat saturation post gadolinium
MRI Sequence selection

STIR/T2 FS

- Simple
- No injection
- Inflammatory tracks ‘bright’
MRI Sequence selection

**STIR/T2 FS**

- Fibrotic areas dark

OEDEMA _before_ fistula plug

FIBROSIS _after_ fistula plug

STIR
MRI Sequence selection

**STIR/T2 FS**

- BUT thin tracks not always easy to see
MRI Sequence selection

STIR/T2 FS

- Granulation tissue vs. fluid can be difficult
MRI Sequence selection

T1 FS with Gadolinium

- Injection required
- Inflammatory tracks ‘bright’
- Fibrotic areas/fluid dark
- Good for granulation vs. fluid (e.g. Crohn’s disease Rx)
MRI STIR vs T1 + gad

Undercall with STIR alone

- ? Fistula
- Difficult to see on STIR
- More conspicuous with T1 + gad
- Both seen and treated at EUA
Overcall with Gad

- ?residual ‘Fistula’ 12 months post mucosal advancement flap
- No fluid on STIR
- Patient assymptomatic on follow up
- EUA - nil to find
MRI STIR vs T1 +gad

Fluid vs. inflammation

- Crohn’s disease? For infliximab

? fluid collection

Enhancing granulation tissue - No collection
MRI STIR vs T1 + gad

Fluid vs. inflammation

• Crohn’s disease? For infliximab

? fluid collection

Non enhancing fluid collection confirmed
Role of T1FS + gadolinium

- Complex/recurrent disease
- Crohn’s disease assessment
- In combination with STIR/T2 FS

STIR

? fluid collection

T1FS + gad

Non enhancing fluid collection confirmed
Understanding fistulas

- Anatomy critical
Understanding fistulas

Sir Alan Parks 1920-1982, Royal College of Surgeons England
Understanding fistulas

Prof Steve Halligan
University College Hospital
London

Dr John Spencer
St James’s University Hospital
Leeds
MRI - Puborectalis
MRI - Puborectalis

- Puborectalis - U or V shaped sling
- Important landmark - Dentate line
MRI - Puborectalis

- Puborectalis - U or V shaped sling
- Important landmark - Dentate line is just caudal
MRI – Dentate line

- Dentate line invisible on MRI
- ~2cm from anal verge, mid canal
MRI - Intersphincteric plane
Intersphincteric plane & Pathology

Why important?

- Focus for interpretation

STIR

T1FS + gad

Focal inflammation in neutropenia
Intersphincteric plane & Pathology

Why important?

- Focus for interpretation

Focal intersphincteric abscess
Persistent pain – nil clinically

STIR  T1FS + gad
Reporting findings
My approach…

“Un bon croquis vaut mieux qu'un long discours”

“A good sketch is better than a long speech”

Attributed to N Bonaparte
Reporting findings

1. What is it? Fistula or something else?
   - Blind sinus / Abscess / Pilonidal Sinus
2. What type of fistula?

- Inter/Trans/Supra/Extraspincteric
Reporting findings

3. Simple or complex?

Simple transsphincteric

Complex transsphincteric
Reporting findings

4. Step by step – Internal opening

- Height and clock position

Visible defect – 6 o/c

Predicted defect – 6 o/c
Reporting your findings

5. Step by step – Path of the fistula

- Intersphincteric / transsphincteric

Intersphincteric 6 o/c

Crosses sphincter
High at 6-7 o/c
Reporting your findings

5. Step by step – Path of the fistula

- Suprasphincteric / extrasphincteric

- Position levator crossed

? underlying aetiology

? Crohn’s

? Malignancy

Extrasphincteric crosses levator at 7 o/c
6. Step by step - External opening

- Location and clock position

Natal cleft 6-7 o/c
4cm from anal verge

Perineum 6 o/c
1.5 cm from anal verge
Reporting your findings

7. Step by step – Complex features

- Extensions – number, location and clock position

Intersphincteric horseshoe
3-7 o/c
Mid canal

Ischioanal fossa
4-5 o/c
Blind ending
Reporting your findings

8. Step by step – Complex features

• Involvement of other structures

Fistula to vagina
12 o/c Lower canal

Osteomyelitis coccyx
MRI and surgical planning

- MRI findings can modify or delay surgery
- For assessment of persistent symptoms
MRI and surgical planning

- Evaluate presence of sepsis before definitive intervention

Seton in high transsphincteric fistula

BUT large undrained supralevator extension
MRI and surgical planning

- Is the seton in the right place?
- Suprasphincteric (*not* trans)
MRI and surgical planning

- Mapping recurrence after failed treatment

Transsphincteric fistula after fistula plug

Patent internal opening
• MRI technique is important