An MRI pictorial review of HIV in the abdomen and pelvis

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Learning objectives

Our exhibit will aim to pictorially review some conditions related to HIV affecting some of the systems within the abdomen and pelvis. This will be done under two main headings:

Infections:
- CMV
- Tuberculosis
- Syphilis

HIV associated neoplasms:
- Kaposi Sarcoma
- Non-Hodgkin's Lymphoma
- Squamous Cell Carcinoma

Background

The acquired immunodeficiency syndrome (AIDS) was first described as a clinical entity in 1981 and HIV (Human Immunodeficiency Virus) was identified as the causative organism in 1983 (1).

The HIV virus is recognised by host cells that exhibit the CD4 surface glycoprotein. It replicates within these cells resulting in their destruction and defective T cell homeostasis and subsequent immunodeficiency.

Hence, AIDS is a disorder of cell-mediated immunity, clinically defined by the presence of multiple opportunistic infections and certain characteristic malignancies.

Hence, abdominal and pelvic pathology include a number of rarer infections and tumours related to immunosuppression.
Magnetic Resonance (MR) imaging is now routinely used in providing pre-operative diagnoses and surgical road-mapping in the treatment of benign and malignant diseases of the abdomen and pelvis.

**Imaging findings OR Procedure details**

**Kaposi Sarcoma (Fig. 1)**

- KS is the most common AIDS-related tumour in homosexual men and in populations in parts of Africa (2).

- The prognosis of gut KS is less than 6 months, as opposed to KS limited to the skin which has a prognosis of the order of 2 years (3).

- The gastrointestinal tract is the 3rd most common site of KS, after skin and lymph nodes.

- The most common radiological finding is of submucosal masses with or without central ulceration ('target' or 'bulls-eye' lesions)(4). It can occur anywhere in the GI tract as has been illustrated below but has a predilection for the small bowel. Typical appearances are of GI tract focal masses with segmental, nodular bowel wall thickening and bulky, hyperattenuating, enhancing lymph nodes is typical of KS (5).

**AIDS-related Lymphoma (Figs 2 - 5)**

- Non-Hodgkin's Lymphoma occurs more commonly in patients with AIDS than in normal people.

- Radin et al. reviewed the CT scans of 112 patients with NHL in 1993 and showed that 54% of patients with extra-nodal NHL manifest in the gastrointestinal tract.

- The stomach and small bowel are the two most frequent sites of involvement by Non-Hodgkin's Lymphoma.

More than one portion of the gastrointestinal tract may also be involved. Radiological findings of gastric non-Hodgkin's Lymphoma include circumferential or focal thickening of the gastric wall and mural masses with and without ulceration.
The radiological manifestations of small bowel Non-Hodgkin's lymphoma include diffuse or focal bowel wall thickening and fungating masses. Intussusception can also occur but is rare (6).

Renal lymphoma occurs in approximately 10% of AIDS-related lymphoma and has a predilection for the highly aggressive B-cell lymphomas, eg NHL and Burkitt's lymphoma and tends to present in one of two ways:

- Bilateral multiple renal masses
- Direct extension of retroperitoneal lymphadenopathy engulfing the kidney, renal sinus or ureter.

**Anal Carcinoma (Fig 6 and 7)**

This is usually a squamous cell cancer and is most common in homosexual men.

Risk factors for anal carcinoma include:

- Having receptive anal intercourse.
- Being infected with human papilloma virus.

5 stages of tumour size are present in the current staging of anal cancer:

Tis - Carcinoma in situ

T1 - 2cm or less in size.

T2 - 2-5cm.

T3 - >5cm

T4 - Can be of any size but have grown into surrounding organs such as the urethra or bladder.

**Giant Condylomata Acuminatum/Buscke-Lowenstein Tumour**

(Fig 8)

- Large, slow growing, cauliflower like mass which occur in the genital or peri-anal regions. It is caused by human papilloma virus (HPV) and is seen in homosexual men.
- The lesion may be associated with necrosis, secondary infection, haemorrhage or fistulation.

- Although locally invasive, the lesion shows benign characteristics with no nodal or distant metastases.

- MR imaging features of the giant condylomata acuminatum have not been described in the literature. In our case, MR imaging demonstrated a cauliflower like high signal mass on T2W imaging. No peri-lesional oedema was evident.

**Hepatocellular Carcinoma (Fig 9)**

- Patients with HIV are at high risk of being co-infected with Hepatitis B or C and hence at increased risk of developing hepatocellular carcinoma (HCC).

**Castleman Disease (Fig 10)**

- This is a diverse group of lymphoproliferative disorders of differing histopathologic properties and biological behaviour. It usually entails a benign giant lymph node hyperplasia.

- On MRI they present as a heterogeneous mass hyperintense compared with muscle on T1w imaging or being markedly hyperintense on T2w imaging.

**OPPORTUNISTIC INFECTION**

**CMV Colitis (Fig 11)**

- CMV in persons with HIV infection is the result of reactivation of the latent virus in a previously infected host. These patients do not usually present until their CD4 count is less than 100 cells per microlitre.

- The most common feature of CMV colitis is thickening of the bowel wall and narrowing of the lumen. Classically the disease involves the right colon and caecum and may extend into the terminal ileum(4).

- The least common radiological manifestation is of an inflammatory mass or a ‘pseudotumour’. This may be mistaken for KS or lymphoma but ‘fat stranding’ in the surrounding mesenteric fat adjacent to the mass are
more suggestive of a CMV pseudotumour than neoplasm as it represents contiguous inflammation

**Rectal Syphilis (Fig 12)**

- Syphilitic infection is rising in the Western population in amongst the urban population between the ages of 24 and 28. Homosexual men are amongst the highest at risk due to having multiple partners. Anal lesions secondary to syphilis are usually asymptomatic and include proctitis, polypoid growths, pseudotumours or ulcers.

- MRI of primary rectal syphilis has not been documented in the literature before. In our case series (correlated with histopathology and positive VDRL tests) the imaging pattern is one of proctitis. In proctitis secondary to syphilis, the appearances mimic that of inflammatory bowel disease where there is rectal wall thickening.

**Proctitis secondary to Chlamydia Trachomatis (Fig 13)**

- Chlamydial infection of the lower rectum and anus usually results in a mucopurulent discharge.

- Infection with Chlamydia trachomatis as well as Neisseria gonorrhoea is not uncommon.

- In cases of Chlamydia trachomatis infection, gram negative cocci are not seen. Diagnosis is either confirmed by culture from anal swabs or highly sensitive and specific PCR tests.

- Imaging usually shows a form of proctitis.

**Tuberculosis (Figs 14 and 15)**

- TB in HIV infected patients occurs earlier than other AIDS-defining opportunistic infections, usually when the patient's CD4 cell count is in the range of 150-350 cells per microliter(7).

- The gastrointestinal tract may be affected in any segment, but the most common location involves the ileum. Routes of infection include swallowing of infected sputum, haematogenous spread from active pulmonary TB or direct extension from adjacent
infected lymph nodes. *In the ileocaecal region there is classically thickening of the ileocaecal valve, the medial wall of the caecum and the terminal ileum*(4).

**Images for this section:**

![Sagittal T2w image through the pelvis shows rectal wall thickening with a submucosal KS mass and a mesorectal lymph node.](image)

**Fig. 1:** Sagittal T2w image through the pelvis shows rectal wall thickening with a submucosal KS mass and a mesorectal lymph node.
Fig. 2: TrueFISP coronal sequence through the abdomen illustrates a focal segment of bowel wall thickening.
Fig. 3: T2 sagittal view shows a homogenously mildly hyperintense rectal mass.
**Fig. 4:** Large mural rectal mass shows homogenous enhancement.
Fig. 5: Fat suppressed T2 coronal sequence showing direct extension of retroperitoneal lymphadenopathy engulfing kidney.
Fig. 6: Axial view demonstrating T1 anal squamous cell carcinoma that spares the external sphincter.
Fig. 7: T4 anal squamous cell carcinoma involving the external sphincter and puborectalis diseng between 3 - 6 o'clock.
**Fig. 8:** Axial T2w STIR image showing giant condyloma accuminatum (anal wart).
**Fig. 9:** Diffuse area of low signal in the right lobe of the liver in keeping with infiltrative hepatocellular carcinoma (HCC).
**Fig. 10:** Diffuse para-aortic lymphadenopathy that on biopsy was shown to be Castleman disease.
**Fig. 11:** Colonic wall thickening in CMV colitis is typically circumferential and is significantly greater than that in UC, Crohn's or pseudomembranous colitis.
Fig. 12: Sagittal T2w image shows non-specific rectal wall thickening in rectal syphilis.
Fig. 13: Coronal T2w image shows diffuse mucosal oedema in the rectum secondary to chlamydia infection
**Fig. 14:** Axial TrueFISP image showing inflammation of the ilacus and psoas with a collection extending into the subcutaneous and an inflamed terminal ileum secondary to M.TB
**Fig. 15:** Axial T2w image showing a liver abscess in the left lobe of the liver.
**Conclusion**

- As illustrated the abdomen and pelvis is a common location for many common AIDS defining illnesses in the form of opportunistic infections or one or two specific neoplasms.

- Knowledgeable interpretation of imaging by a radiologist in the context of the level of immunocompromise may help clinicians to a presumptive diagnosis and treatment and spare the patient invasive diagnostic procedures.

**Personal Information**

**References**


