



CT Colonography

CT colonography (CTC) is a relatively new method of investigating the large bowel. The technique uses a multislice CT scanner which scans the entire abdomen and pelvis with thin slices in a single breathhold.

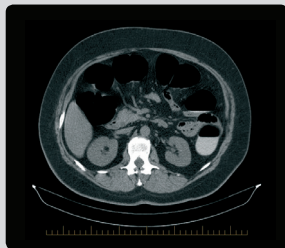
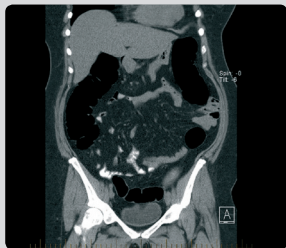
Workstations post-process large data sets and display images in an interactive format. The bowel can literally be 'flown through' as well as dissected. The area immediately outside the bowel wall is also visualised with standard cross-sectional imaging.

The main indication for performing CT Colonography is to screen for polyps and other lesions in the colon. Colorectal cancer is predominantly a preventable disease if precursor adenomatous polyps are identified at an early stage and subsequently removed.

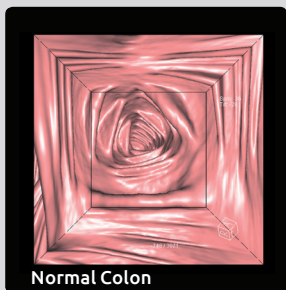
COLONIC POLYPS

Prevalence of colonic polyps increases with age, particularly beyond 50 years of age. Untreated, colonic polyps can and do progress to carcinoma over several years. The risk of cancer development from sporadic 10 mm colonic polyps is approximately 8% at 10 years and 24% at 20 years. The risk for cancer development depends on the size of the polyp, villous histology, and its association with polyposis syndromes.

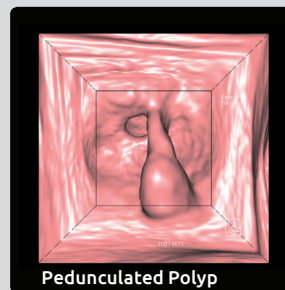
CT Colonography - Cross Section



CT Colonography- "fly through" views



Normal Colon



Pedunculated Polyp

Comparison of CT Colonography (CTC) to Colonoscopy

- Accuracy – both techniques have an accuracy of >95% for the detection of polyps > 10mm.
- Colonoscopy better for detection of flat lesions and smaller polyps
- CTC better for extra-colonic lesions (8% require additional workup and 2% are significant)

CT Colonography (CTC) is indicated for:

- Diagnosis/exclusion of colorectal cancer in symptomatic patients: especially for symptoms with a relatively low risk of colonic malignancy eg change of bowel habit, abdominal pain, weight loss, (patients who may have had a barium enema in the past).
- For screening in average risk patients.

CT Colonography (CTC) especially useful:

- In elderly and frail patients
- When colonoscopy may be higher risk e.g. patients on Warfarin
- Following failed or incomplete colonoscopy: If the incomplete colonoscopy is an obstructing lesion then a combined CTC and staging CT scan (using IV contrast) may be performed
- When colonoscopy may be difficult or painful: eg: following diverticulitis (wait 6 weeks)

CTC is not the test of choice:

- Suspected mucosal lesions such as inflammatory bowel disease and angiodysplasia.
- Inflammatory bowel disease as it is associated with difficult to see "flat lesions"
- Known polyp syndromes (including familial) where biopsy is likely
- Young patients (<40 years) as there is a greater potential radiation risk
- Males with Fe deficiency anaemia (20% positive predictive value for significant lesion)
- Positive iFOBT. Expected to have a significant finding in up to 40%

TECHNIQUE

Bowel cleansing	Low residue diet 2 days before Cleansing laxatives the day before
Faecal tagging	Oral stool marking. Makes residual bowel contents relatively dense
Procedure	Small tube inserted in rectum. Bowel inflated with air or CO ₂
CT Scan	Usually quick recovery after examination No IV contrast or sedation Supine and prone series to distribute the fluid and gas.

By Dr Ricky Rutledge
Radiologist

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Hearing loss and acoustic neuroma

What is hearing loss?

Hearing loss can be described as the impairment of perceived loudness and/or clarity of sounds. Most people may experience an episode of temporary hearing loss at least once in their lives; however, if hearing does not return to normal within a couple of days or if there is sudden and severe loss of hearing then further investigation is indicated.

What causes hearing loss?

Hearing testing (audiometry) is used to classify the condition into two types:

1. Conductive hearing loss (CHL)

Conductive hearing loss occurs when sound is not conducted efficiently through the external auditory canal to the eardrum and the ossicles of the middle ear. Possible causes include infection of the ear canal (otitis externa), perforation of the eardrum and middle ear infection (otitis media).

2. Sensorineural hearing loss (SNHL)

Sensorineural hearing loss occurs when there is abnormality of the inner ear, the nerves from the inner ear to the brain stem or of the brainstem itself. Possible causes include congenital inner ear malformation, head trauma or tumours of the auditory nerve such as acoustic neuroma.

How is sensorineural hearing loss in adults investigated?

It is prudent to assume that any unilateral sensorineural hearing loss in an adult is caused by acoustic neuroma until proven otherwise. The investigation of choice is an MRI examination of the brain and internal acoustic meati (IAMS) with high resolution imaging targeting the inner ear structures, acoustic nerves, cerebellopontine angles and brainstem.

What is an acoustic neuroma?

Acoustic neuromas are intracranial extra-axial tumors that arise from the Schwann cell sheath investing the cochlear or vestibular nerve of the auditory nerve. They are a benign neoplasm which can arise within the inner ear (intralabyrinthine), the internal acoustic meatus (intracanalicular) and the cerebellopontine angle cistern.

What are the symptoms of an acoustic neuroma?

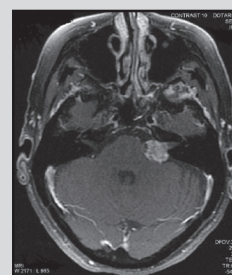
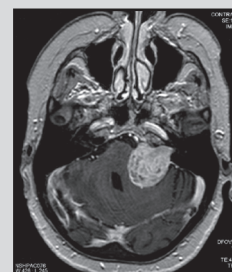
As an acoustic neuroma grows on the auditory nerve it impairs the conduction of sound signals from the cochlea to the brainstem resulting in hearing loss. Around 10% of patients with acoustic neuromas present with unilateral tinnitus without associated subjective hearing loss. Vertigo and disequilibrium are also uncommon presenting symptoms.

What does an acoustic neuroma look like on MRI?

They are well defined enhancing tumours which may be as small as 1-2 mm within the internal acoustic meatus, but which may grow to widen the meatus and then extend with a rounded component into the cerebellopontine angle giving the classical "ice cream cone" appearance (fig 1a T2W image, fig 1b T1W post Gd image). When large, the cerebellopontine angle component may have significant mass effect upon the brainstem and cerebellum (fig 2a T2W image, fig 2b T1W post Gd image).

How is an acoustic neuroma treated?

If an acoustic neuroma is diagnosed by the MRI examination the patient is usually referred to an ear, nose and throat surgeon (otorhinolaryngologist) for consideration of excision. Traditionally the surgical approach is via the base of the skull (suboccipital craniotomy), but more recently access has become possible through the ear (mastoidectomy). Non-surgical options such as focussed radiotherapy or gamma knife therapy have also been used.



By Dr Stephen Gock
Neuroradiologist

Bathing Beauty Gets a CT Scan



It's not every day our technicians scan a bronze statue, let alone a life size bathing beauty.

The Hawkes Bay team recently completed free CT and X-ray scans on the "The Bather" (Her proper name is Grande Bagnante III). She is the work of Emilio Greco (Italy 1913-1995) and dates from 1957.

The Bather is currently residing at the Hawke's Bay Museum & Art Gallery in

Napier. To highlight her beauty, she is to take up a key position in the foyer of the museums newly restored 1930s Art Deco building.

This move and subsequent installation required more knowledge than is available to the naked eye. The museum staff needed to know where her weak points and joints in the casting were in order to better move and support her on a seismic moveable plate that flexes during an earthquake.

Being made of brass, the Hawkes Bay technicians weren't sure if they were able to help due to all the flare off metal. They soon established that the metal was generally thin due to a special technique for thinning the brass that Greco had employed and therefore it wasn't an issue.

That is where the Hawkes Bay team came to the rescue! MRT Lyn Law, assisted by David Frost from the Hawkes Bay Museum, scanned as much of her as possible. It wasn't without its challenges, "We had her weighed before she arrived, so we knew that wasn't an issue, but because of her very unforgiving posture we had to scan the upper torso, then reposition and scan the lower limbs. It would have been good if she had a little more flexibility! We'll request a mummy next time; something lying flat and with no metal," says Lyn.

Everyone involved enjoyed the unique experience but Lyn, always the professional, never completely relaxed, "I forgot to turn the auto breathing off, asking her to 'breathe in and hold your breath', she wasn't cooperative at all— and neither were my colleagues who just laughed!" says Lyn.

Stephen Delvisco, radiologist with the Hawkes Bay practice, also gave of his time by assisting with interpreting the images and suggesting an X-ray as well. Radiographer Janice Dacent X-rayed the statue to obtain more information for the museum.

The Hawkes Bay Museum staff were impressed with the quality of the work, "We found Lyn, and in fact all her colleagues there, incredibly helpful and professional. Her care for this precious sculpture was fantastic, she really understood that her surface is fragile which is why we use gloves and we move her carefully to avoid denting her. Lyn took time to explain to us just what she was doing which was fascinating."

"We were more than happy to do this for the museum as a goodwill gesture to the city and our community. And it goes without saying that we'd love to do other things like this in the future for them!" says Lyn.

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