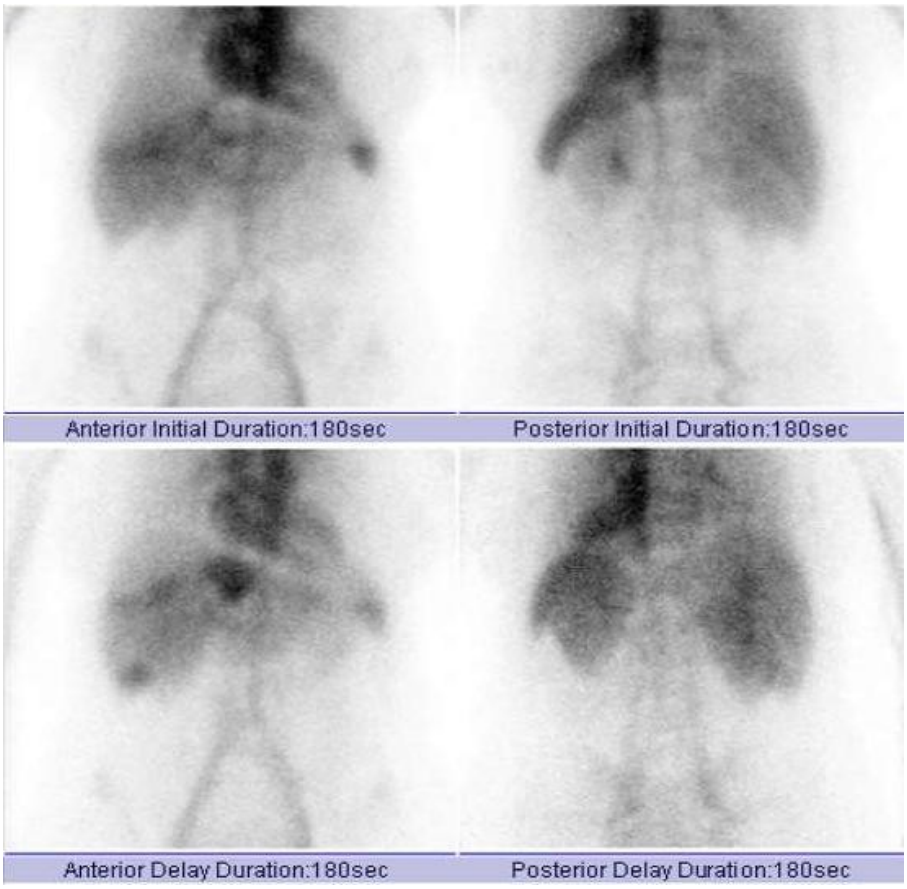

# seasonal rains

RURAL ALLIANCE IN NUCLEAR SCINTIGRAPHY

SPRING/SUMMER EDITION 2011






The official half-yearly newsletter of the Rural Alliance In Nuclear Scintigraphy

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## Introduction

The Australian health care system has been described or defined by the 'inverse care law'; those Australians in the most need of health services receive the least. This might equally reflect life for rural Nuclear Medicine professionals; those with the greatest need for support and representation actually have the least. It is true that the rural Nuclear Medicine professional develops unique skills and capabilities not generally manifest in metropolitan counterparts; an evolutionary adaptation ('survival of the fittest'). Despite these attributes, rural Nuclear Medicine professionals are confronted with professional isolation that fosters a number of inequities:

- Professional representation at state and federal level.
- Accreditation and continuing professional development (CPD).
- Diffusion of innovation, technology and techniques.
- Support for training, leave (illness or recreation) and workload.
- Career development pathways.

RAINS aims to quench the thirst of rural Australia left parched by professional under representation.

## RAINS Committee



Sit back and enjoy Seasonal RAINS.

**From the Editor**

It is with great pleasure that on behalf of the executive and editorial committees of the Rural Alliance in Nuclear Scintigraphy, I bring to you the Spring/Summer 2011 edition of Seasonal RAINS online journal.

I hope everyone enjoyed the winter period. In North Queensland, it's difficult to get below 7 degrees on the coast, and even then I think it is cold – something I will just have to put up with in the tropics I guess.

For those of you that attended ANZSNM meeting in Darwin, I hope you enjoyed your time and didn't aim laser pens at the cost of others frustrations too many times.

Only days away until another exciting multimodality imaging conference in Sydney RAINS will be co-hosting. The programme looks of high calibre with international and local speakers providing their wealth of knowledge , sharing it with us.

It is the intent of RAINS for all nuclear medicine practitioners to come together and make a contribution to the ongoing development of our profession.

I urge you, the reader, to contemplate making a contribution to this journal at some stage during your professional career, so that your peers can appreciate the diversity in our ways of performing procedures, engaging in research, and reviewing medical literature as just a few examples.

Don't forget to submit something to "Letters to the Editor"to share information or voice your concern. Submit to seasonal@rains.asn.au .
We'll see how it goes.

Cheers,

***Nathan Cassidy***

Don't forget about the conference in November!
http://www.rains.asn.au/Rains2011/2011%20program%20MRS%20v5.pdf

# Start Collecting Your CPD Points With RAINS Now!

## Purpose of RAINS

The purpose of RAINS is to offer a support network for rural and remote Nuclear Medicine professionals. The support network aims to engage with and develop strategies to overcome the unique professional difficulties encountered in rural and remote Australia.

RAINS does not stand as an alternative to ANZSNM state branch membership, but as an adjunct to it.

RAINS offers a seamless representation of rural and remote Nuclear Medicine professionals. That is, RAINS is a single unified group of individuals with common needs and philosophy. There are neither state borders nor division between the private and public sectors nor delineation based on corporate ownership. RAINS does respect and honour commercial in-confidence and intellectual property rights.

## Vision

Equitable provision of representation and professional opportunities for rural and remote Nuclear Medicine professionals. Strategic networking and support to foster professional development, continuing education and collaborative solutions to issues of isolation. Recognition and exploitation of distinctive competencies of rural practitioners.

***Building A Future For Rural Nuclear Medicine***

## RAINS Core Values

- Innovate, adapt, overcome.
- Be committed, meet our commitments.
- Perform beyond industry norms.
- Invest in our work, invest in ourselves.
- Improve, continually. Embrace innovation, embrace challenge.
- Support CPD.
- Demand equity for rural Australia.
- Offer support, ask for support.
- Exploit strengths, overcome weaknesses.

## RAINS Mission

- Provide a voice and representation
- Overcome barriers to CPD
- Promote equity of service provision
- Undertake research on rural issues
- Respect issues of commercial in-confidence BUT remove borders on core rural activities
- Highlight and exploit the distinctive competencies of the rural Nuclear Medicine professionals
- Provide a network for support and collaboration
- Integrate student clinical placements
- Lobby professional bodies on rural issues
- Promote Nuclear Medicine services in the rural health sector
- Inform and lobby, where appropriate, legislative and regulatory processes impacting on rural Nuclear Medicine

## Membership

Membership to RAINS is open to those Nuclear Medicine professionals sharing the needs and philosophies characteristic of rural Australia; underpinned by "professional, social and cultural isolation". To that end, membership is open to those Nuclear Medicine professionals employed in a Nuclear Medicine practice that satisfies any one of the following criteria:

1. Practice located in a centre that the Federal Government Rural, Regional and Metropolitan Area (RRMA) classification deems either rural or remote.
2. Practice located in a centre that is more than 200 km from the state capital.
3. Practice located in a centre that is more than 100 km from nearest other nuclear medicine practice.

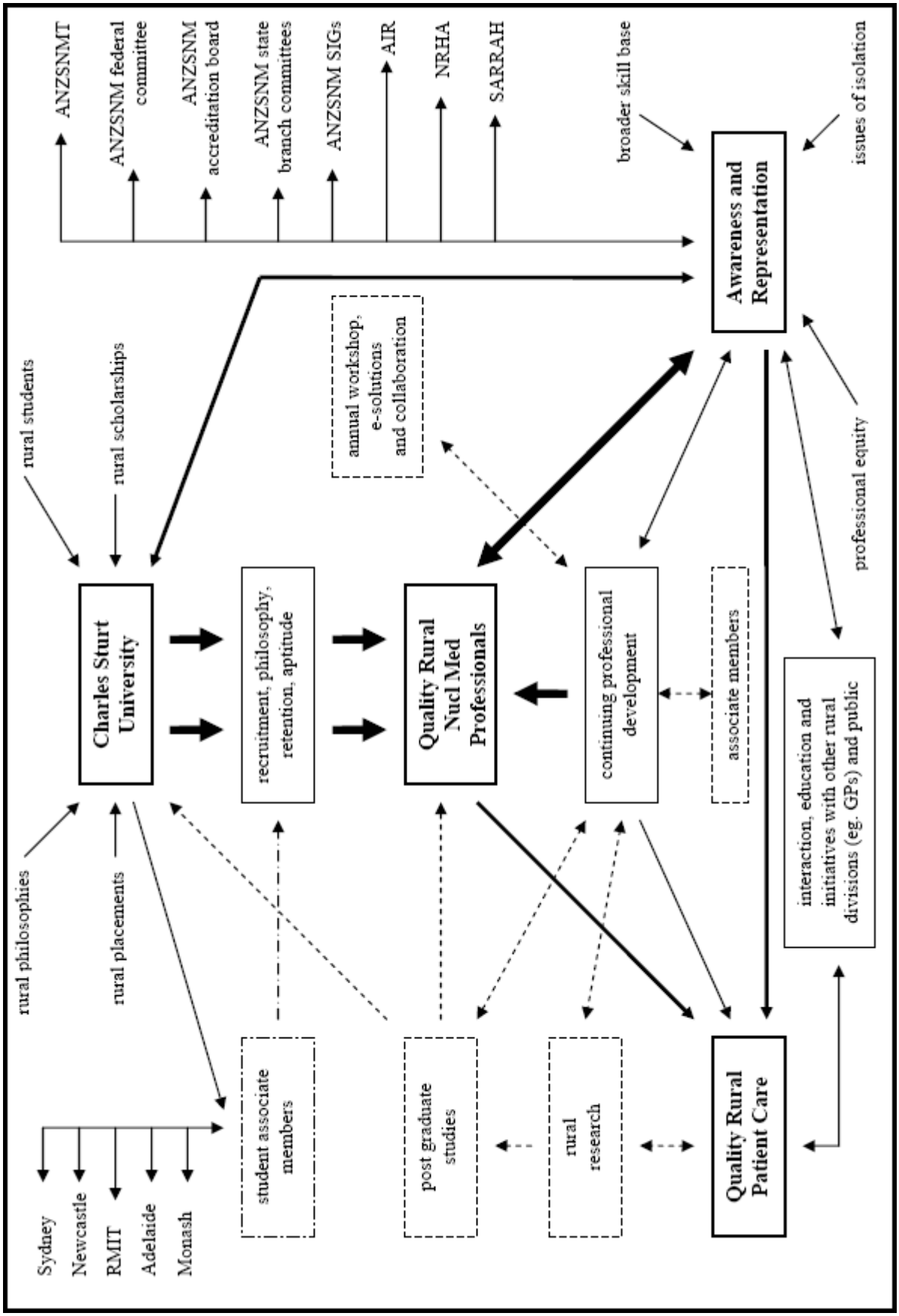
Associate membership to RAINS is open to:

1. Students not actively employed in Nuclear Medicine who are undertaking undergraduate or post graduate studies in Nuclear Medicine at any Australian university and who come from a RRMA classified rural or remote centre.
2. Nuclear Medicine professionals employed in a Nuclear Medicine centre that does not meet the criteria for ordinary membership but who believe issues of professional isolation have a deleterious impact on professional development. Examples of such isolation include, but are not limited to; academics, researchers, company representatives and regional isolation with a small Nuclear Medicine network (e.g. Newcastle, Central Coast, Gold Coast).

Membership entitlements include, but are not limited to:

- Newsletter (electronic)
- Networking (eg. research, problem solving, reduce professional isolation)
- CPD activities (e-journal club, e-grand rounds, conferences)
- Representation
- Support
- Full voting rights (ordinary members only)

# Flow Chart of RAINS Activity



# President's Report

Welcome to the Spring/Summer edition of our seasonal RAINS Newsletter. For those of you fortunate enough to attend the ANZSNM conference in Darwin in May, it was great to catch up and share some sunshine in the middle of Winter!

I would like to welcome our new members to RAINS, and thank you for your interest and support. It is the ongoing contributions from our members that will ensure the success of this newsletter.

With the advent of our RAINS newsletter prize, we have been pleased to receive a number of quality submissions, thank you to all who have made the effort.

I will place here an obvious reminder to those who have yet to register for the impending 2011 conference being held this year again at the Stamford Grand in North Ryde. It is the weekend of the 12th/13th of November, and based on last years response and the registrations to date, there are limited places left, so don't miss out! A final program has been included in this newsletter.

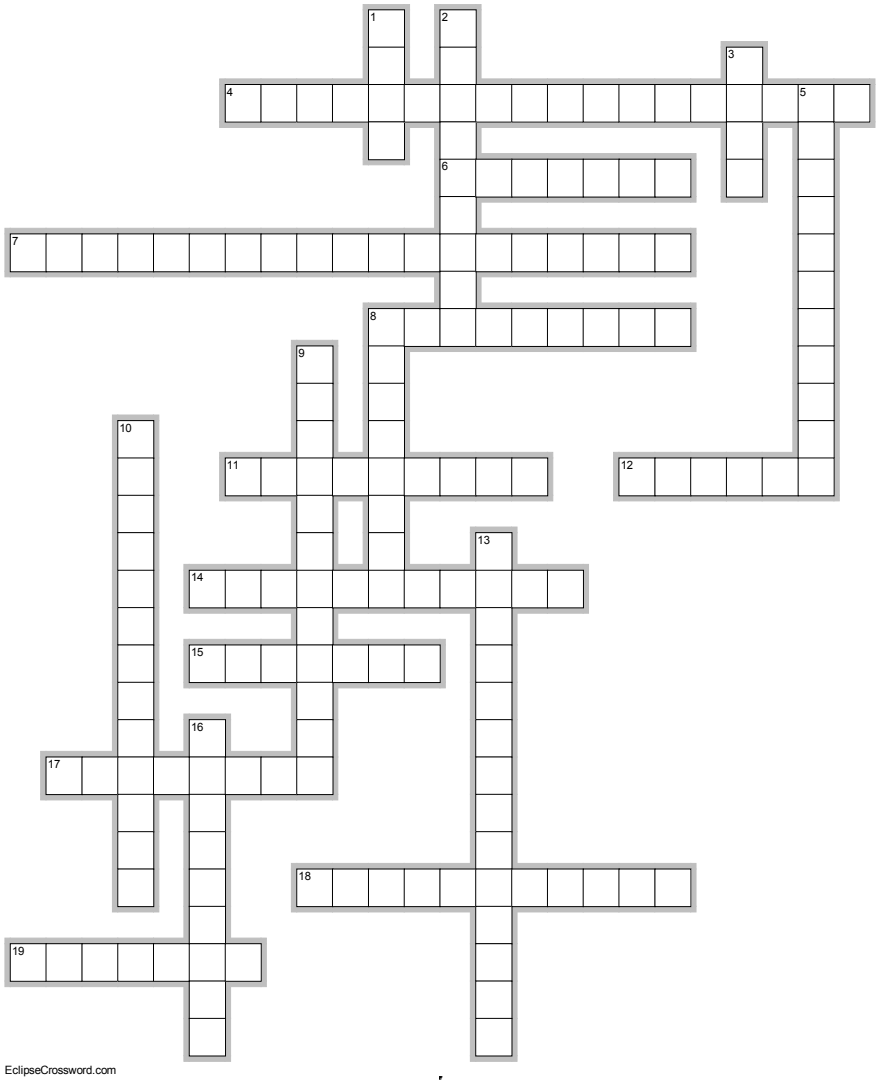
Don't forget to check out the RAINS website (www.rains.asn.au). We have included a section on "how to write CPD articles". This provides an opportunity for those interested parties to earn extra points and assist their colleagues in their professional development.

The 2011 RAINS AGM will be held at the conference in North Ryde, this year is not an election year. See you all in Sydney!

***Matt Ayers***

# Thyroid/Parathyroid Crossword.

**Cristyn Davies and Kym Barry - Hunter New England Imaging**




**Across**

4. What should be marked when performing a thyroid scan? (18)
6. What structure joins the two lobes of the thyroid? (7)
7. What is the most common cause of hyperparathyroidism? (19)
8. What is the name of the thyroid hormone with the highest concentration in the blood, also known as T4? (9)
11. What is the most common thyroid carcinoma? (9)
12. What is a pathology which has diffuse increased uptake of tracer on images? (6)
14. What pathology may have a normal scan appearance, with abnormal antibodies detected in a blood test? (11)
15. What isotope may be used diagnostically in patients with Hashimoto's thyroiditis, who develop further swelling in the neck while still taking T4 replacement therapy? _____? (7)
17. A rare form of thyroiditis that on scan appearance may simulate Hashimoto's disease? (8)
18. What technique improves the sensitivity and specificity of dual isotope (Sestamibi/ Pertechnetate) parathyroid scanning? (11)
19. A thyroid scan showing no functional thyroid tissue in the neck but an area of avid tracer accumulation lying in the midline corresponding to the posterior part of the tongue (chin level) is called a _____ thyroid. (7)

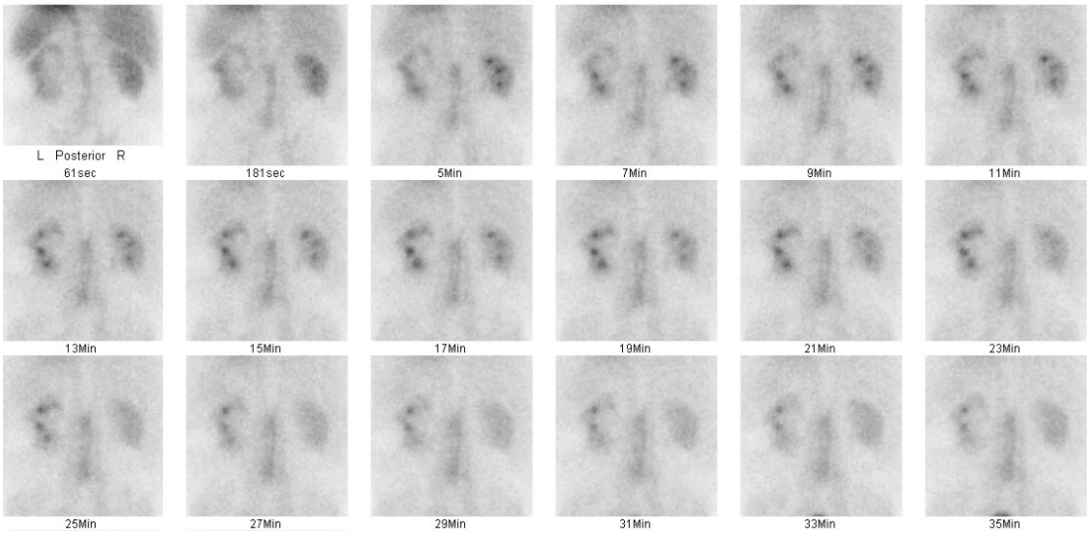
**Down**

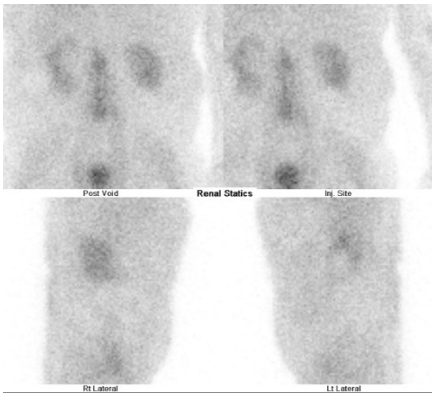
1. What invasive procedure is often performed following detection of a solitary cold nodule on a thyroid scan? (Abbreviated) (4)
2. What gland stimulates production of TSH? (9)
3. How many parathyroid glands do most people have? (4)
5. What is the name of the cells within the parathyroid gland which produce parathyroid hormone? (11)
8. What other isotope may be used in conjunction with I-131 for the follow up of patients with thyroid carcinoma? _____ (8)
9. What is the name for the clinical presentation of bulging eyes associated with Graves' disease? (12)
10. What does excessive parathyroid hormone secretion result in? (13)
13. What is a major contraindication when performing Tc99m thyroid imaging? (14)
16. What type of thyroid carcinoma may be inherited? (9)

# What The...?

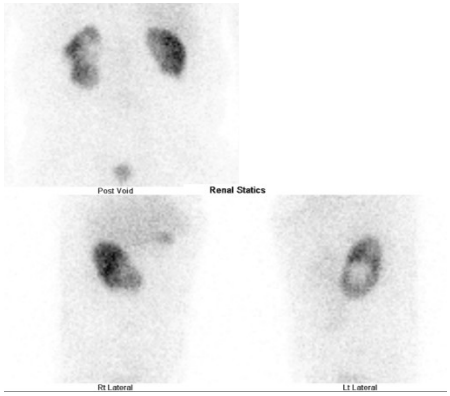
by Georgia Kent
PRP Diagnostic Imaging, TUGGERAH

$^{99m}$Tc-DTPA renogram on a 67 year old male with ANCA vasculitis and acute renal failure as a secondary component. An unusual area of tracer accumulation was noticed within the midline soft tissues. SPECT/CT was performed for localisation. The area of unusual uptake was not visualised in a MAG 3 performed the next day. What is it?

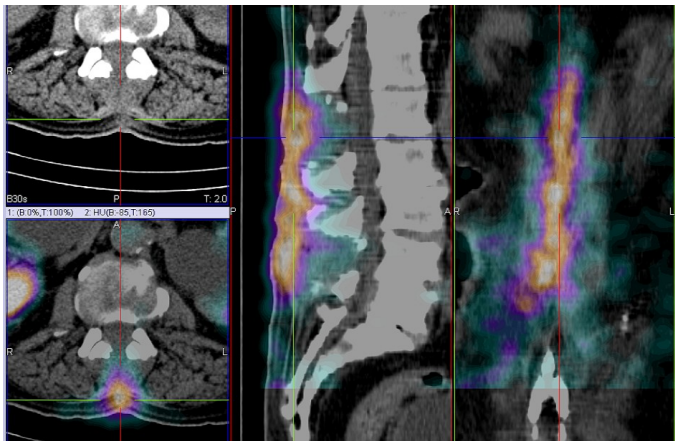



99mTc DTPA Post Void Images




99mTc MAG3 Post Void Images



99mTc DTPA SPECT/CT

Send your 'What The …… ?' image, solution and author details to seasonal@rains.asn.au

**"CALL FOR SUBMISSIONS"**

The RAINS organising committee is kindly inviting all parties for the submission of CPD articles toward the RAINS newsletters.

**An annual RAINS Newsletter prize has been established.**

RAINS is working to recognise and support excellence within the Rural Nuclear Medicine community by offering an award for the best CPD article submitted to the RAINS newsletter. This prize will be awarded to the best judged contributor/CPD article submitted to the RAINS newsletter.

Keep submitting your articles, Seasonal RAINS will be back in 2012.
Send to seasonal@rains.asn.au

**What the...? Answer**
**by Georgia KENT, PRP Diagnostic Imaging, TUGGERAH**

Four months prior to the renogram, the patient had a lumbar decompression to remove epidural abscesses on L1, 4, 5. The linear area of tracer accumulation corresponded to the scar on his back from this procedure. At the time of reporting the cause for this unusual tracer localisation was unknown, but was thought to be of no significance to his renal scan results.
There could be a number of explanations for this unusual appearance, including:

- the patient could be bleeding from unhealed scar tissue on his back

  -the scar was not bleeding and appeared to be well healed on the surface of the skin

- it could be urine contamination on his skin

  -the patient had an indwelling catheter bag, the SPECT/CT localised the activity to be below the surface of the skin

- his vasculitis could be affecting the skin in this area and causing an increase in blood flow

  -his skin was clear of the red spots, hives, rash and itchiness that are present in vasculitis of the skin

- the patient could have a subcutaneous bleed from unhealed scar tissue

    - the tracer accumulation was not visualised on his MAG3 study the following day, ruling out this possibility, as a bleed of that magnitude would not have healed so completely in only 24 hours

- Frederick Datz[1] lists keloid scar tissue as an uncommon area of DTPA uptake outside of the genitourinary system

    -area of tissue did not appear to be a keloid scar as it was below the surface of the skin and the skin thickness was preserved on the CT image

- Gadolinium-DTPA contrast enhancement has been reported in MRI scans of epidural abscesses, where the activity persists in the epidural space after surgical removal of the abscesses and represents post-surgical scarring, similarly as to in our patient

    -gadolinium-DTPA contrast localisation due to properties of gadolinium rather than the DTPA chelate as occurs in NM

After much research, our department has come to the conclusion that the DTPA localisation is most likely due to an inflammatory reaction within the soft tissue underneath the scar associated with its healing process. This would be possible due to the tiny size of the DTPA compound, which allows it to permeate capillary walls and leak into areas of inflammation, in the same way as it permeates the capillary walls of the glomerulus. This property of DTPA has allowed it to be used in the past as an inflammation imaging agent in the brain, where it crosses the blood brain barrier in areas where its permeability has been increased due to inflammation or damage[2]. Because it has a high renal excretion and reduced background activity, DTPA allows early imaging in the brain and is quite sensitive in acute infarcts, well-differentiated gliomas and strokes[3].

To confirm this hypothesis the scan could be repeated in a few months time, or the patient could have a $^{67}$Ga-citrate scan or an $^{18}$F-FDG scan, both of which are used to investigate inflammatory processes in the body. Unfortunately due to the patient's age and ongoing health problems, these further investigations are impossible and actually unnecessary due to the insignificance of this anomaly to the original clinical investigation.

**References**


- Datz, FL. Gamut's in Nuclear Medicine. 3rd ed. United States of America: Mosby- Year Book, Inc.; 1995.
- Lorberboym M, Lampl Y, Sadeh M. Correlation of $^{99m}$Tc-DTPA SPECT of the blood-brain barrier with neurologic outcome after acute stroke. J Nucl Med [Internet]. 2003 Dec 1 [cited 2011 Oct 26];44(12):1898-1904. Available from: http://jnm.snmjournals.org/content/44/12/1898.full
- Datz, FL. Handbook of Nuclear Medicine. 2nd ed. United States of America: Mosby- Year Book, Inc.; 1993.

# RURAL ALLIANCE IN NUCLEAR SCINTIGRAPHY

## ANNUAL GENERAL MEETING (AGM)

## TO BE HELD AT THE 2011


## 8th Annual CPD/CME Conference

## Stamford Grand, North Ryde

(Adjacent to Macquarie University, Sydney)

**Saturday 12th & Sunday 13th November, 2011**

Details will be provided at conference

# Multiple Hepatic Haemangiomas: A Case Report.

Christopher Skilton - Hunter New England Imaging

**Abstract:**
The incidental discovery of liver lesions has become reasonably commonplace, often being found on morphological or other imaging studies. Although most liver lesions are found to be benign, their presence warrants further investigation.

This case report provides some current information on, and is a good example of multiple hepatic haemangiomas, found incidentally on a staging CT scan for breast cancer, in a non symptomatic patient.

This case report presents the case of a 52 year old female patient with at least six slightly lobulated low attenuating hepatic lesions involving both lobes of the liver, discovered on a staging CT scan. The diagnosis of hepatic haemangiomas was confirmed in at least 3 lesions on a radionuclide Red Blood Cell (RBC) scan.

**Background**:
In clinical practice, haemangiomas are the most common benign tumour affecting the liver[1,2,3,4] with a prevalence ranging from 1% to 20%.[1,2,5,6] Although the exact aetiology remains unknown,[4,5,7] they are thought to be congenital vascular malformations, which increase in size with the growth of the liver.[3] They are composed of masses of blood vessels that are atypical or irregular in arrangement and size.[4,7] The increasing change in size is thought to be due to ectasia rather than hypertrophy or hyperplasia,[1,5,7]and clinical examination and laboratory tests are typically normal.[5,8,9]

Approximately two out of three hepatic haemangiomas are found in the right lobe of the liver, and the majority (up to 90%) are solitary.[2,10,11] For the small percentage of patients that do exhibit multiple hepatic haemangiomas, some will also have haemangiomas in other anatomic sites including skin, lung, or brain.[5,11] The size of hepatic haemangiomas can vary greatly; however, most measure less than 5cm.[2,7,10] There is no consensus in literature, however, those measuring greater than ~5cm in size are known as "giant haemangiomas".[1,5,7,12]

Hepatic haemangiomas are generally asymptomatic and are most frequently found incidentally during imaging, surgery, or autopsy.[10] They are more common in females than males, with a ratio of about 5:1.[1,2,3,6,11]

Hepatic haemangiomas belong to a group of non-epithelial lesions,[6] arising from the endothelial cells lining the blood vessels.[1] Macroscopic examination demonstrates well-delineated, flat lesions of a dark red-blue colour that are compressible, or may partially collapse on sectioning[1,6] (Figure 1-A). Some degrees of fibrosis, calcification, and thrombosis may be observed most commonly in the largest lesions.[6] According to Gore et. al. (2011), "the interface between the hepatic haemangioma and the surrounding liver is well circumscribed and demarcated. However, there is generally no fibrous capsule and occasionally vascular channels may extend into the adjacent liver parenchyma".
Microscopically, haemangiomas are made of cavernous vascular spaces lined by flattened endothelium, underlying fibrous septa of various widths (Figure 1-B). Small haemangiomas may become entirely fibrous, appearing as "a solitary fibrous

nodule."[6] Their vascular lumina are either empty or blood-filled, and thrombi are frequently present.[13] Their blood supply arises from the hepatic artery.[1]

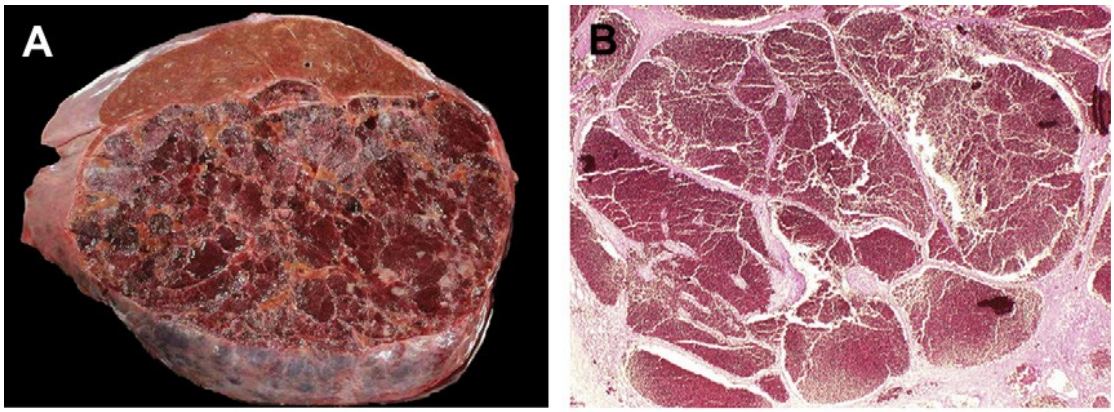



**Figure 1:** (A) Macroscopic view. (B) Microscopic view, showing the cavernous vascular spaces lined by flattened endothelium and underlying fibrous septa.[6]

Treatment is not usually indicated for asymptomatic patients with lesions <5cm in size, and especially when their stability has been demonstrated on a follow-up study at least 6 months following diagnosis.[1] Asymptomatic patients with giant haemangiomas (>5cm) may need to be monitored more closely and regularly, due to the associated risks of haemorrhage, thrombosis, and rupture.[11]

Paradis (2010) and Choi et. al. (2005) have stated that the "indications for treatment include severe symptoms, complications, and inability to exclude malignancy". Depending upon the number, location, and size of lesions, treatment could include surgical enucleation or resection (applicable for single haemangiomas, or large resectable lesions),[11] transarterial catheter chemoembolization, hepatic irradiation, or transplantation (potentially required for large, unresectable lesions, lesions involving the hepatic hilum, or multiple lesions).[1,6]

Hepatic haemangiomas present a diagnostic challenge because differentiation from other types of liver lesions (such as adenoma, focal nodular hyperplasia, hepatic cysts, haemangio-endothelioma, hepatic metastasis, and primary hepatocellular carcinoma) can be difficult.[4] Furthermore, they could be mistaken for hypervascular malignancies or could coexist with, or mimic other benign or malignant hepatic lesions.[4] Imaging studies that could be used in diagnosing hepatic haemangiomas include ultrasound, multiphase contrast-enhanced CT, MRI, hepatic arteriography, digital subtraction angiography, and Nuclear Medicine Red Blood Cell studies.

The discovery of liver lesions has become reasonably commonplace, often being incidentally found on morphological or other imaging studies. Although hepatic haemangiomas are the most common benign liver lesions,[1,2,3,4] they are not the only possibility, and therefore clarification is required. Given that hepatic haemangiomas are composed of masses of blood vessels that are atypical or irregular in arrangement and size,[4,7] they have the potential for significant bleeding, and if biopsied could lead to complications, including death.[5] The use of imaging studies and their ability to accurate diagnose liver lesions is therefore increasingly important.

**Case presentation:**
A 52 year old female with a history of recently diagnosed node positive, left sided breast cancer, presented for staging scans (CT - brain, chest, abdomen and pelvis and bone scan).

As an incidental finding, the CT (Figure 2) revealed: A few slightly prominent left axillary lymph nodes are demonstrated measuring up to 1cm in small axis diameter (suspicious for metastatic spread), and at least six slightly lobulated low attenuating hepatic lesions involving both right and left lobes with the largest lesion identified in the segment 4A of the left lobe of liver measuring 5.7 x 5.4cm in cross section.

A few of these lesions demonstrate nodular peripheral contrast enhancement on arterial phase imaging, however, no definite filling in is noted on the portal venous phase scan. These lesions were stated to be "indeterminate in nature", and required further imaging with either a multi-phasic CT study or Radionuclide assessment.

A radionuclide RBC Scan was performed to assess these lesions. The initial dynamic and static images (Figures 3 and 4) showed an area of decreased perfusion in the region of the largest liver lesion (segment 4A).

The delayed images (Figures 5, 6 and 7) showed an "increased concentration of the radiopharmaceutical in at least 3 separate sites involving the 4$^{th}$, 6$^{th}$ and 7$^{th}$ liver segments. The largest abnormality resides in the 4$^{th}$ segment adjacent to the diaphragm. The abnormalities noted are consistent with multiple hepatic haemangiomas".

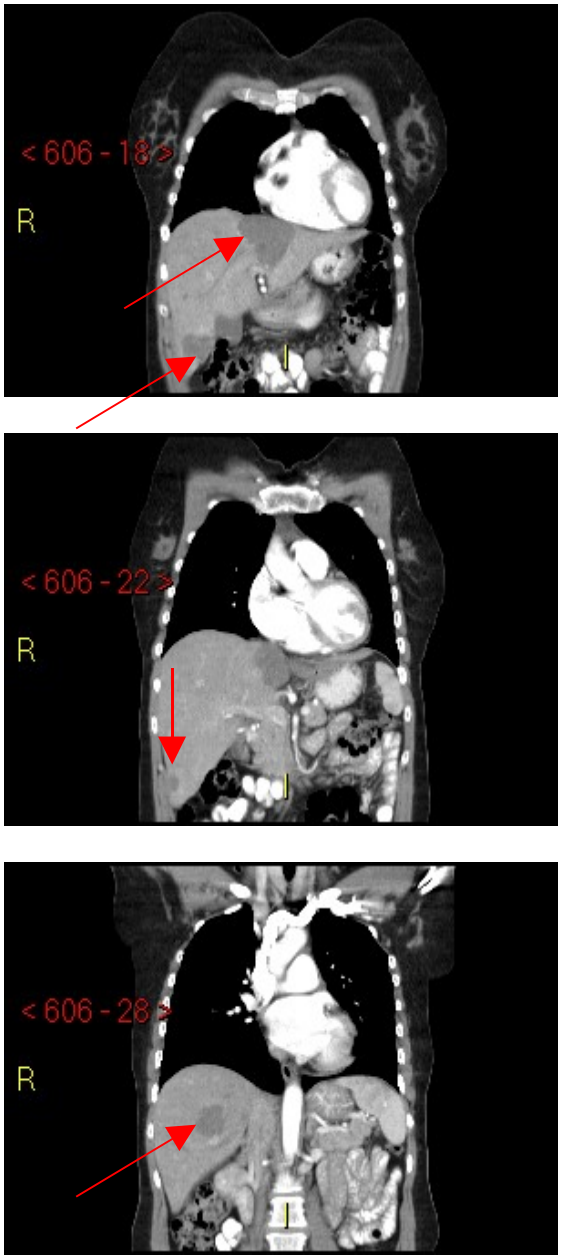



**Figure 2:** Coronal CT slices (arrows highlight 4 of the lesions noted throughout the study).

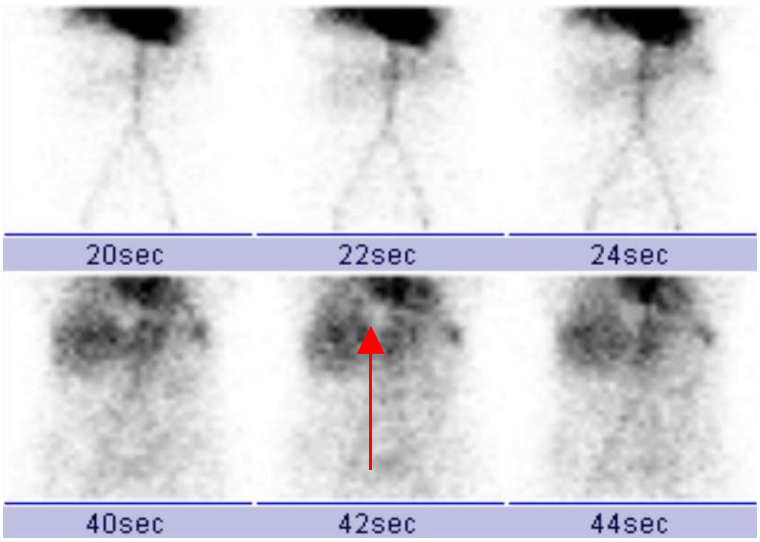



**Figure 3:** Immediate Anterior dynamic images (2sec/frame for 60 frames) showing an area of decreased perfusion in the region of the largest liver lesion, (segment 4A).

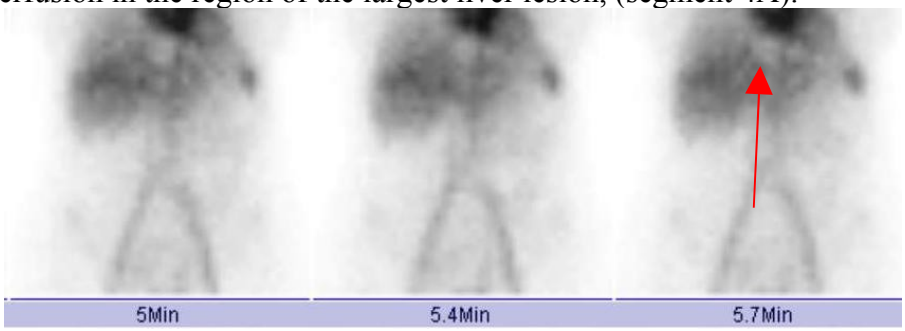



**Figure 4:** Further Anterior dynamic images (20sec/frame for 24 frames – therefore 10min total duration) showing an area of decreased perfusion in the region of the largest liver lesion, (segment 4A).

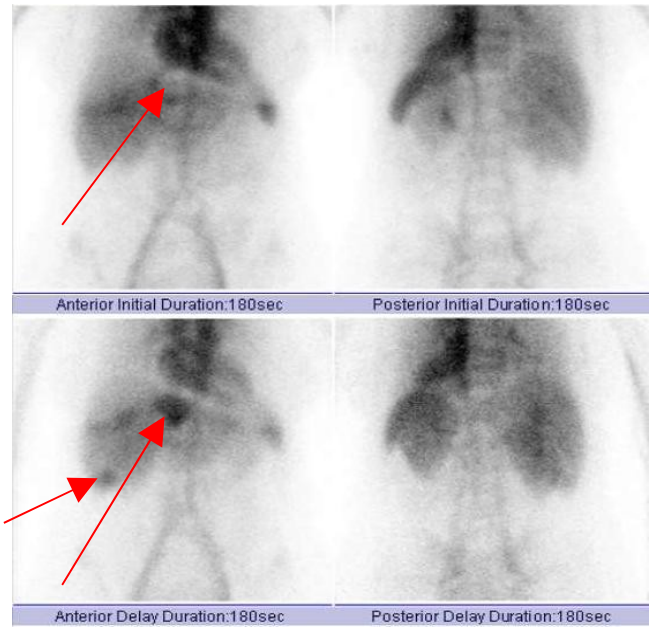



**Figure 5:** Initial and Delayed (Anterior/Posterior) static images (3mins per view, multiple views taken - not all displayed), showing decreased initial uptake in the medially placed lesion with marked increased delayed uptake, with a second lesion in the delayed images noted in the right lower lobe of the liver (segment 6).

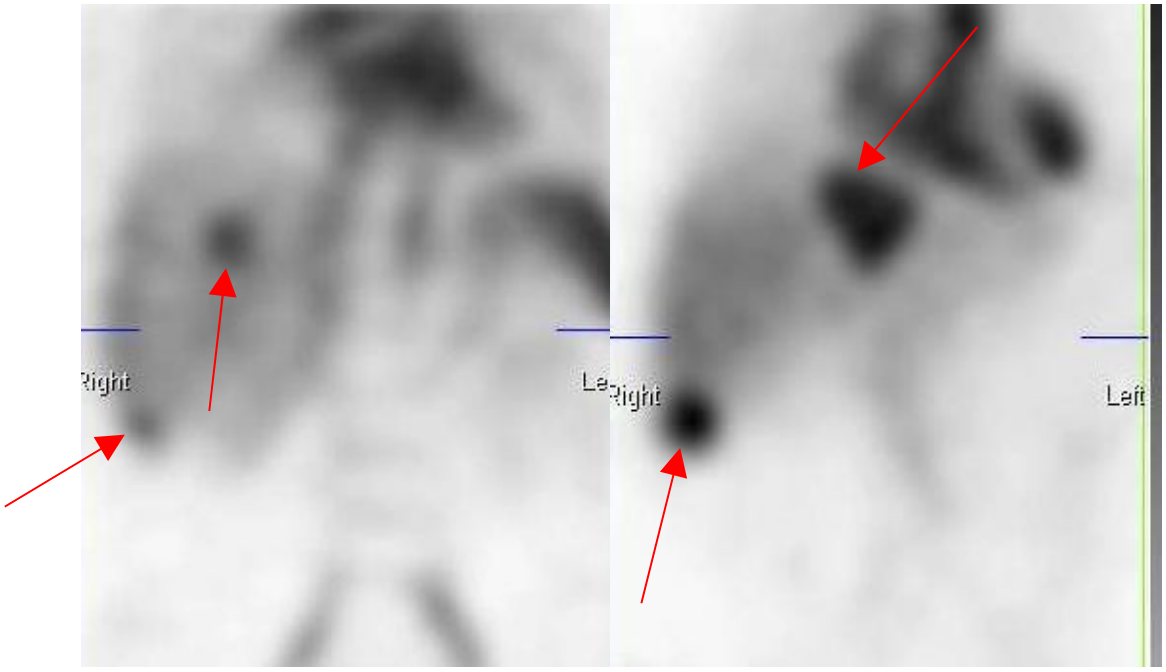



**Figure 6:** SPECT - Coronal slices of the RBC liver scan (arrows highlight the 4 lesions marked on the CT scan).

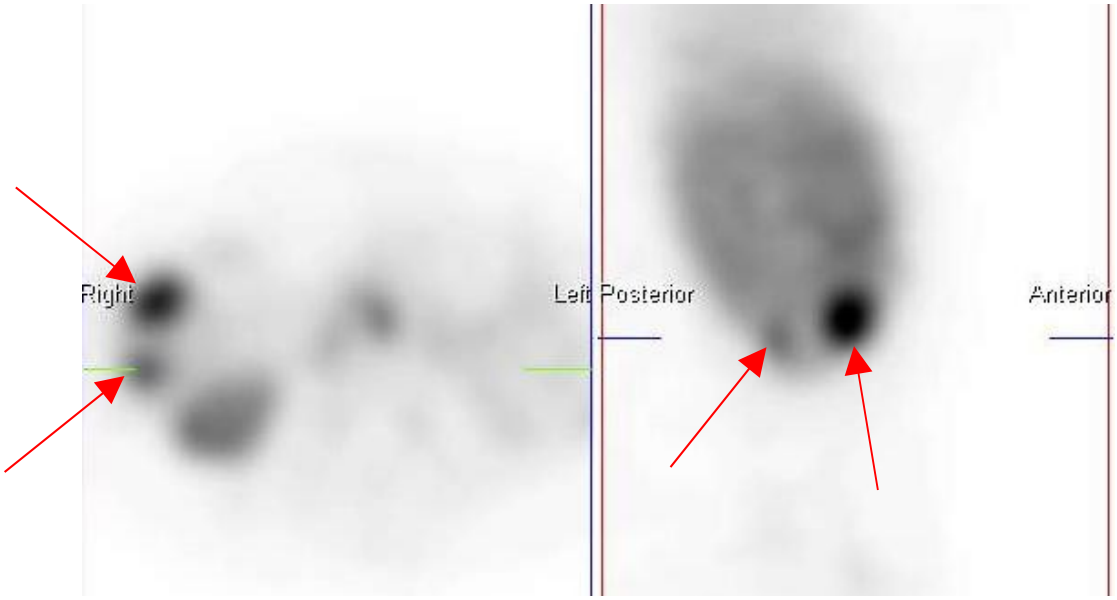



**Figure 7:** SPECT – Transverse and Saggital slices of the RBC liver scan (showing the two separate lesions in the right lower lobe of the liver – Segment 6).

**Interpretation:**

The interpretation of $^{99m}$Tc-RBC scans relies mainly on the comparison of the initial dynamic and static images, to the delayed images. On initial imaging, hepatic haemangiomas can demonstrate decreased or similar perfusion to the remainder of the liver. This reduced perfusion reflects the fact that these lesions have lower blood flow (ml/gm/min), relative to the surrounding normal liver tissue.[3,5,14] Due to this reduction in blood flow, mixing of the radiolabelled RBC's with the unlabelled RBC's (within the haemangioma) occurs slowly,[3,5,14] and hence the decreased perfusion in the initial images, compared to normal liver tissue.

However, the fact that hepatic haemangiomas have a large blood volume means the delayed images should reveal marked increased retention of $^{99m}$Tc-RBC's compared to the surrounding liver tissue. This is known as a perfusion / blood pool mismatch.[3]

Unfortunately not all hepatic haemangiomas demonstrate a decreased initial perfusion compared to the remainder of the liver. Therefore images may simply show uniform initial activity throughout the liver and focal increased delayed uptake. The differential diagnosis would be consistent with a hepatocellular carcinoma, as these are typically hypervascular, and could show increased activity in the delayed images.[15]

Any liver lesion requires careful correlation with other clinical, pathological and imaging studies. According to Shaked and Reddy, (2009) there are "many factors that must be taken into consideration in the differential diagnosis of liver masses, including: gender, age, history of oral contraceptive (OC) use, history of liver disorders, hepatic biochemical tests, and tumour markers". If these factors are considered in conjunction with appropriate and well performed medical imaging studies, an accurate diagnosis can often be easily made.[16]

**Discussion:**

This case study is a demonstration of multiple hepatic haemangiomas, found as incidentalomas on a staging CT scan for breast cancer, in a non symptomatic patient. Partly due to a difference in the preparation and the scanning procedure utilised in acquiring the staging CT scans (compared to a multi-phase CT performed explicitly to diagnose a hepatic haemangiomas), the images obtained were ambiguous in classifying the hepatic lesions, and the report stated them to be "indeterminate in nature". Given the size of the lesions noted, $^{99m}$Tc-Red Blood Cell labelled Imaging was performed due to the very good sensitivity and specificity of diagnosing hepatic haemangiomas (greater than 89% and greater than 89% (~100%) respectively).[3,11,17]

Although, there were 6 lesions noted on the CT scan, only 4 were perceptible on $^{99m}$Tc-Red Blood Cell labelled Imaging. This leaves the possibility that the further 2 lesions could represent a coexisting pathology; however, it is likely that they represent small hepatic haemangiomas that were not able to be visualised. Given this is the first knowledge of their existence, a follow up with an ultrasound or possibly CT at 6 months (perhaps, during restaging scans) could help to classify the lesions. Further investigation could be justified by the fact that the largest of the lesions is greater than 5cm (giant haemangioma), and as stated by Trotter, (2001) these "may need to be monitored more closely and regularly, due to the associated risks of haemorrhage, thrombosis, and rupture".

Another interesting point has come from the surgery undertaken for the breast cancer (eventual mastectomy and axillary clearance). The histopathology results revealed strong positive nuclear staining of tumour cells for both oestrogen receptors, and progesterone receptors (ER and PR positive). In the case of hepatic haemangiomas, this is interesting as oestrogen therapy has been suggested as a possible promoter of growth[3,7] and that oestrogen enhances endothelial cell proliferation, migration, and organisation into capillary-like structures.[7,18] However, oestrogen receptors have not been demonstrated in all haemangiomas, and growth has been demonstrated in the absence of oestrogen (postmenopausal women).[12]

As an anecdotal point, if this patient undergoes anti-estrogen therapy (drugs that block the estrogen receptors on the breast tissue cells slowing their estrogen-fuelled growth), there is potential for a similar effect on the hepatic haemangiomas. A literature review found little information or research performed into the effects of anti-oestrogen drugs on hepatic

haemangiomas. Therefore, the mechanism by which oestrogen may regulate growth in hepatic haemangiomas and the effect of anti-oestrogen therapy on hepatic haemangiomas (although unlikely to have clinical significance) requires further clarification.

**Conclusion:**

Hepatic haemangiomas are relatively common in the general population, with estimates of their prevalence in the order of 1 to 20%. They are the most common benign tumour of the liver, thought to be congenital vascular malformations, which increase in size with the growth of the liver. They are typically discovered incidentally as generally they do not cause symptoms. Accurate differentiation from other types of liver lesions is required, and a combination of imaging studies may be utilised to do this.

This case study demonstrates a patient with multiple liver lesions found incidentally on a staging CT scan, that were later diagnosed as hepatic haemangiomas on a radionuclide Red Blood Cell (RBC) scan. Follow-up of this patient to get some more information regarding the two lesions not identified on the $^{99m}$Tc-Red Blood Cell labelled Imaging, and the progression of this patient throughout treatment, and further imaging will be performed.

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Article title: **Multiple Hepatic Haemangiomas**

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**CPD Questions:**

1. What is thought to be the cause of the change in size of hepatic haemangiomas?

2. What are some other common sites to find haemangiomas?

3. What is a giant hepatic haemangioma?

4. What do hepatic haemangiomas arise from?

5. Why do hepatic haemangiomas show a decrease in radiopharmaceutical activity on initial RBC imaging?

6. Why do hepatic haemangiomas show increased radiopharmaceutical activity on delayed images?

# The Doctor of Health Science

**Introduction**
The Doctor of Health Science (DHlthSc) at CSU is a professional doctorate that allows candidates to pursue a research higher degree of the same standard as the PhD but within a structure that is aimed at improving professional practice. Specifically, it offers a research based approach for provision of solutions relevant to the professions and industry.

Professional doctorates aim to provide a tool for advanced research enabling candidates to contribute in a significant way to the knowledge and practice in their profession or discipline area. Consequently, candidates enrolled in professional doctorates tend to be more intrinsically motivated aiming to improve professional practice and enhance job satisfaction.

**Course Structure**
The DHlthSc is offered by part-time distance education mode and is composed of coursework and an applied research/professional component. Student's progress through the research/professional component of the DHlthSc is monitored by the requirement that students complete subjects in sequence thus meeting pre-defined milestones. The applied research/investigation allows students to develop a research question or topic for investigation by conducting an intensive literature review, critique and reflecting on their professional practices.

The DHlthSc culminates in a professional portfolio (including an exegesis), which integrates the research/ investigation within their professional practice. The professional portfolio incorporates reports, papers and publications prepared throughout the course with an exegesis to link the results back to the profession and professional practice, and original question on which the research or investigation is based. The professional portfolio with exegesis is subjected to external examination in accordance with University regulations.

The duration of the DHlthSc is the equivalent of 4.5 years part time enrolment.

*Enrolment Pattern*
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HSC701 Reflective Practice in Health Science
HSC702 Proposal For Applied Research
HSC703 Research Project and Report 64 Points
HSC704 Health Science Portfolio / Exegesis

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For admission to the DHlthSc applicants would need to demonstrate that they:

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- have had a minimum of five years of relevant professional and/or vocational experience (with relevance being determined by the DHlthSc Course Coordinator in conjunction with the proposed principal supervisor); and
- normally hold a Masters degree or equivalent (by coursework) in an approved area of Health Sciences, with credit grades or above in all subjects undertaken.

**Course Aims and Objectives**
The DHlthSc promotes an advanced, critical reflection on professional practice in the health sciences and aims to:

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- satisfy the educational needs of professionals working in or aspiring to work in the most senior tiers of the health sciences and related sectors;
- promote the acquisition of advanced analytical and problem solving skills and conceptual insights that enhance the capacity of the candidate to undertake positions of significant responsibility in the health sciences;
- encourage excellence in scholarship and focused research within the candidates discipline area.

**Course Coordinator**
Dr Janelle Wheat
Senior Lecturer, Faculty of Science
Telephone: 61 2 69332750
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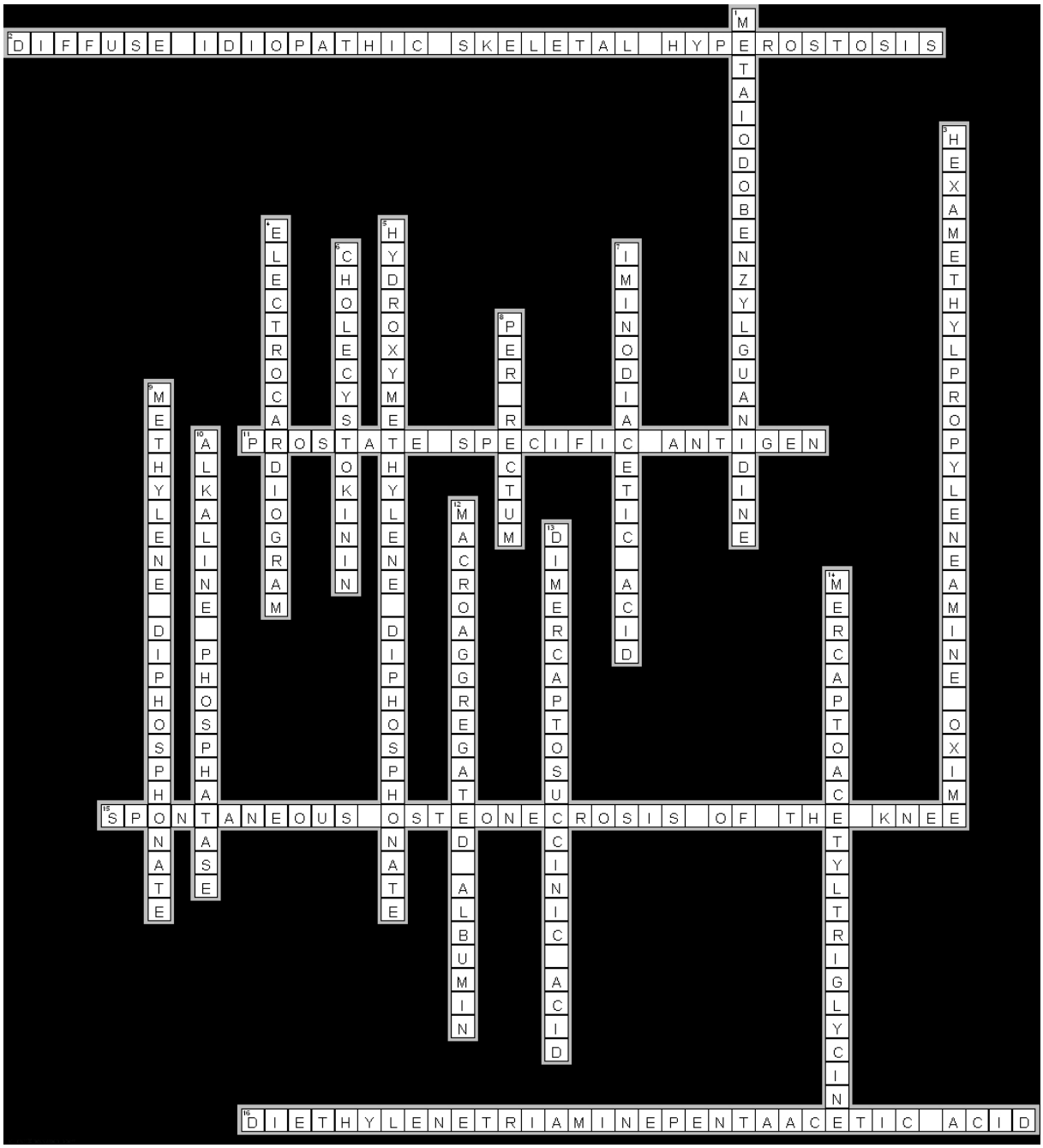


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Seasonal RAINS is a newsletter with four issues per year. Issues will be sent to RAINS members during Winter, Spring, Summer and Autumn.

Seasonal RAINS will accept a number of types of submissions. All work must be written in English and submitted in Microsoft Word. All submission must be accompanied by a cover letter (email is sufficient) indicating the type of submission, details of authors and departments, contact details of the corresponding author and a statement indicating that the submission is not subject to copyright elsewhere.

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300-500 word limit.

## Interesting Image

1 JPG image and 300 word limit case presentation.

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Summary of recent or upcoming events. Update RAINS member achievements; publication, conference presentation or scholarship.

## Book Review

Review of a recently released nuclear medicine text. Minimum of 1 page.

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20-30 minute power point presentation of a relevant journal article in Nuclear Medicine. Submissions should include written text and discussion for each slide plus 10 test questions.

## E-Grand Rounds

Submit a 20-30 minute review summary and presentation (power point) of one or more clinical cases. Content should include patient history, scan methodology, other imaging procedures, relevant technical information, final report and patient outcomes. Submissions should include written text and discussion for each slide plus 10 test questions.

## In-Service Education

Seminars should be submitted as power point presentations with audio narration. Audio recordings should be embedded in the power point presentation (not linked) using a radio quality setting (22kHz, 16 bit, mono). Ensure sound quality is suitable for circulation. Valuable presentation might only be included if narration is re-recorded. Accepted presentations will be included on the RAINS CPD in-service CD. All presentations should be accompanied by 10 review questions. Presentations should be sent by mail to: The Editor, PO Box U102, CSU, Wagga Wagga, 2678.

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Submissions should provide an educational review of an area of interest. The reviews should be well researched and present all valid perspectives. CPD articles may be accepted after review by the editorial board. Alternatively, the submission may be accepted with some suggested revision or deemed not suitable for the purpose intended (CPD). All submission must adhere to the guidelines provided by the *Journal of Nuclear Medicine Technology*; available on the SNM web site (www.snm.org).

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