MonashHealth

Training & Accreditation in Point of Care Ultrasound

MODULE 5: RENAL

Purpose of Document

This document describes the process for credentialing Emergency Physicians within Monash Health (MH) to perform 'Point of Care' ultrasound (PoCUS)

- RENAL Sonography for Hydronephrosis

Background

Physician performed ultrasound has become an accepted part of clinical management. The immediacy and availability of bedside ultrasound in a variety of clinical contexts means that patient management decisions can be more informed and expedited. Physician performed renal ultrasound enables timely management of patients with suspected hydronephrosis.

Patients presenting to the Emergency Department (ED) with obstructive nephropathy benefit from early detection and treatment, particularly in the context of associated renal tract infection or renal failure (Watkins 2007). Ultrasound can immediately rule out obstruction as the cause of renal failure, by the absence of hydronephrosis (Blecher 2016, Smith-Bindman 2014, Patatas 2014). New ACEM clinical guidelines recommendations suggest: ***Avoid requesting computed tomography (CT) imaging of kidneys, ureters and bladder (KUB) in otherwise healthy emergency department patients, age <50 years, with a known history of kidney stones, presenting with symptoms and signs consistent with uncomplicated renal colic***.(ACEM 2017, Choosing Wisely 2018) This policy emphasises the benefits of avoiding radiation, contrast and cost minimisation.

It has been acknowledged that limited RENAL scanning is an appropriate use for ultrasound within MH Emergency departments. This document has been developed to provide MH training and credentialing guidelines for RENAL ultrasound for hydronephrosis.

This document describes:

- A 3 stage process for accrediting Emergency Physicians to perform RENAL scans
  1. Initial Training
  2. Skill Development / Electronic Log Book / MH Accreditation
  3. Ongoing Audit / Maintaining Skill

- A method for auditing log book and ongoing accreditation (image assessment)

- A practical evaluation consisting of a direct assessment of the skills necessary to obtain and record appropriate ultrasound images for a Renal examination

Objectives

The focus of an ED PoCUS Renal ultrasound examination is to determine the presence or absence of hydronephrosis.

At the end of this module, the Emergency Physician will be able to:

- Identify the sonographic anatomy of the bladder and kidneys, including the renal cortex, pelvis, calyces and hilum
- Optimise the ultrasound image to provide optimal visualisation of the kidneys and bladder
- Understand appearances of various ultrasound artefacts
- Make the diagnosis of hydronephrosis (present or absent)
- Perform accurate volume measurements of the bladder (post micturition residual)
- Use Colour Doppler to exclude dilated renal vein
- Differentiate hydronephrosis from other pathology including renal cysts and extra-renal pelvis

MonashHealth

STAGE 1 - Initial Training

ED Registrars and Consultants wishing participate in advanced PoCUS modules must have completed Monash credentialing in Module 1 eFAST scanning. The physician will meet with Sonographer educators for an initial one hour induction & training session or attend a Monash Health PoCUS Masterclass.

STAGE 2- Skill Development / Log Book / Accreditation

This stage requires the completion of a log book which documents the completion of a minimum 25 RENAL examinations

- An entry is only valid if the Physician is the person performing the examination
- Emergency Physician is to record a minimum of 2 images per side, as described
- Logbook will include 5 positive cases for hydronephrosis
- Multiple entries of same patient at same episode of care is not acceptable
- Symphony PoCUS findings must be completed for every scan
- Images will be sent to Monash Imaging server for upload to PACS
- This process produces an electronic logbook and process for quality auditing and ongoing feedback to physicians
- Physician will be provided with ongoing one-to-one training as required

At the end of Stage 2 when sufficient examinations have been logged, a practical competency assessment for Renal module accreditation will be conducted by PoCUS program sonographer educator.

Quality Auditing

Regular quality auditing will be conducted and data maintained by PoCUS program sonographer educators. Quality audit reports will be provided to ED Governance group, including Directors of Ultrasound & Emergency. Examinations will be qualitatively assessed using a simple system assessing technical adequacy and diagnostic accuracy of examination, with reference to correlative imaging, surgical or clinical findings where available.

eLOGBOOK QUALITY AUDIT FEEDBACK	
3	**good scan, accurate diagnosis & technical quality**
2	**technical errors, but no misdiagnosis**
1	**false negative**
0	**false positive**

Audit results and comments for clinician feedback will be provided in personal elogbooks maintained for clinicians (see also RENAL Audit Guidelines p9). A minimum 25 RENAL examinations will be audited until a physician achieves MH credentialing. Thereafter, random audit of a minimum 5 examinations will be conducted yearly to ensure maintenance of skill and quality.

Accreditation

Once logbook requirements (minimum scan numbers and positive cases) are completed, a brief practical competency assessment will be conducted by program Sonographer. Assessments for those wanting concurrent ASUM CCPU can also be completed at this time.

Alternative Accreditation Pathways

In certain select situations, alternative accreditation pathways may be considered for approval by ED Governance group.

A. Fast tracked 'grandfathering' credentialing for clinicians with considerable prior experience, but no formal credentialing. This process would involve Monash Health program induction, practical competency assessment & the completion of a minimum of five quality reviewed scans, to be reviewed & considered for approval by committee.
B. ASUM CCPU, DDU or other credential holders from external institutions. This process would involve Monash Health program induction, practical competency assessment & the completion of a minimum of five quality reviewed scans, to be reviewed & considered for approval by ED Governance group.

STAGE 3: Ongoing Skills Maintenance

After completing the MH Accreditation process, the Emergency Physician is able to perform RENAL scans within MH. In order to maintain MH credentials they are required to:

1. Perform and log a minimum of 10 RENAL scans annually (no required number of positives)
2. Undertake 3 hours of ultrasound education annually (including practical skills refresher sessions, case review, online resources)

MonashHealth

RENAL Examination:

System Set-up

- Turn machine on
- Enter patient name, UR, doctor initials
- Select correct transducer (C5-2MHz)
- Select correct preset (Abdomen or Renal)

Transducer Positioning

- Orientation of transducer and correlation with image
- Demonstrates the ability to manipulate the transducer to achieve the required images (sliding, rocking, rotating, heel-toe)
- Use of various sonographic windows and patient position to visualise kidneys

Image optimization

- GAIN
- TGC
- Depth
- Focal Zone

Image interpretation

- Identify the kidneys and bladder
- Recognise the presence of hydronephrosis
- Differentiate between hydronephrosis and other pathology (extra-renal pelvis, renal cysts, dilated renal vein)
- Identify the renal pelvis in cases of no hydronephrosis

Recognition of artefacts and how to modify image accordingly:

- Increased attenuation of ultrasound beam due to patient habitus
- Patient movement or respiration
- Shadowing from ribs or bowel gas

Plane 1 - Longitudinal RT KIDNEY

- Visualisation of the kidney in longitudinal/ coronal plane
- Inclusion of upper and lower poles
- Labelled RT KIDNEY

Plane 2 - Transverse RT KIDNEY

- Visualisation of the kidney in transverse plane at hilum (mid)
- Image renal pelvis in transverse plane
- Labelled RT KIDNEY

Plane 3 - Longitudinal LT KIDNEY

- Visualisation of the kidney in longitudinal/ coronal plane
- Inclusion of upper and lower poles
- Labelled LT KIDNEY

Plane 4 - Transverse LT KIDNEY

- Visualisation of the kidney in transverse plane at hilum (mid)
- Image renal pelvis in transverse plane
- Labelled LT KIDNEY

If hydronephrosis is present the following extended assessment is required*

POST MICTURITION Bladder Volume*

- Image bladder volume post micturition
- Measure and record images of the bladder volume using length in the midline longitudinal plane and bladder width & height in the midline true transverse plane if significant amount present OR image bladder only without volume measurements if negligible volume present
- Label BLADDER POST MICT

KIDNEYS Colour Doppler*

- Visualisation of abnormal renal pelvis post micturition in transverse plane using colour Doppler imaging (to confirm true hydronephrosis not dilated renal vein)
- Image renal pelvis in transverse plane with colour Doppler
- Label RT KIDNEY or LT KIDNEY

Integration of results to management of the patient

- Recognise the limitations of a scan and be able to explain these limitations to the patient/carer
- All patients should have a formal imaging investigation as soon as practicable, as clinically appropriate
- Incorporate ultrasound findings with the rest of the clinical assessment

Evaluation

- Completion in ≤ 10 minutes (scanning time only, not including micturition)
- Score: Satisfactory or Non-satisfactory only
- Any score of 0 = Non-satisfactory
- Scores 1 or 2 = Satisfactory
- 2 levels of Pass scores are for feedback and to monitor areas for improvement

MonashHealth

Practical Competency Assessment RENAL Scan

Evaluation
Completion in ≤ 10 minutes
Satisfactory or Non-satisfactory only
Any score of 0 = Non-satisfactory
Scores 1 or 2 = Satisfactory
2 levels of Pass scores feedback & improvement

Physician:

Hospital:

Date: **Assessor:**

Explain Examination	**0** Incomplete or misinformation	**1** Explanation correct but brief	**2** Full explanation with indication and limitations
Patient Details entry	**0** Unable to complete task completely	**1** Accurate but not familiar with machine	**2** Excellent knowledge of machine, accurate input
Selection of Transducer & Presets	**0** Incorrect transducer or preset selections	**1** Correct but some hesitancy in use of equipment	**2** Correct and confident use of equipment
Image optimisation	**0** Suboptimal image optimisation	**1** Optimizes image but hesitant use of functions	**2** Optimizes image confidently & correctly
Demonstration of Right Kidney anatomy	**0** Incomplete/inaccurate demonstration	**1** Mostly demonstrated but unsystematic approach	**2** Systematic approach in demonstrating kidney
Demonstration of Left Kidney anatomy	**0** Incomplete/inaccurate demonstration	**1** Mostly demonstrated but unsystematic approach	**2** Systematic approach in demonstrating kidney
Demonstration of renal pelvis with Colour (if required)	**0** Incomplete/inaccurate use of Colour Doppler in renal pelvis assessment	**1** Some hesitancy in use of Colour Doppler in renal pelvis assessment	**2** Confident use of Colour Doppler in renal pelvis assessment
Interpretation of hydronephrosis	**0** Misinterpretation of ultrasound appearances	**1** Correct but some hesitancy in interpreting appearances	**2** Correct and confident interpretation of appearances
Bladder Volume Measurement (if required)	**0** Incomplete/inaccurate volume measurement	**1** Mostly demonstrated but small calliper error	**2** Accurate volume measurement
Documentation of Examination	**0** Inappropriate images recorded	**1** Inconsistency in image quality recorded	**2** Consistently records correct images
Recognition of limitations and image artefacts	**0** Unable to recognise artefacts/ optimise image	**1** Uncertainty in recognition of artefacts/ optimising image	**2** Confidently recognises all artefacts /optimises image

MonashHealth

QUALITY AUDITING

RENAL module examinations will be routinely audited by PoCUS program sonographer educators for technical and diagnostic accuracy. Reference to correlative imaging, surgical and clinical findings will be made when available. Audit results will be recorded in logbooks for clinician quality feedback. A coloured 'traffic light' system of visual quality feedback will be used (see details below) with further audit comments as required.

All cases with significant error or quality problems (false positive, false negative, misidentification of aorta) will be reported to Director of Ultrasound and Emergency Department Ultrasound Governance group for review. Immediate feedback by email or in person, will be given by program sonographer for such cases. The ED Governance group will follow up issues of repeated poor quality or program non-compliance.

eLOGBOOK QUALITY AUDIT FEEDBACK	
3	**good scan, accurate diagnosis & technical quality**
2	**technical errors, but no misdiagnosis**
A	**misidentified aorta**
1	**false negative**
0	**false positive**

Green traffic light will be recorded for an examination with correct scan planes, adequate sonographic anatomy visualised for each view and correct clinician interpretation, as detailed in scan audit criteria below.

Orange & yellow traffic lights will be recorded for any incorrect scan planes, suboptimal demonstration of anatomy or suboptimal technical settings, as detailed in scan audit criteria below.

Red traffic light will be recorded for any false positive or false negative scan findings, whether from technical or interpretive errors, as verified by correlative imaging or other findings. All significant false positive or false negative cases will be reviewed and verified by ED Governance group & Director of Ultrasound.

MonashHealth

References:

Watkins S, Bowra J, Sharma P et al. *Validation of Emergency Physician Ultrasound in Diagnosing Hydronephrosis in Ureteric Colic.* EMA 2007;19:188-195.

Blecher G, Meek R, Egerton-Warburton D et al. Introduction of a new imaging guideline for suspected renal colic in the ED reduces CT urography utilisation. EMJ 2017;34:749-754.

Australasian College for Emergency Medicine: tests, treatments and procedures clinicians and consumers should question. [Online] Choosing Wisely Australia. Available at: http://www.choosingwisely.org.au/recommendations/acem [Accessed 13 Jun. 2019]

ACEM (2019) P21 Policy on the use of Focussed Ultrasound in Emergency Medicine. West Melbourne, VIC: ACEM 2019 (revised) [online] Available at: https://acem.org.au/getmedia/000b84ee-378f-4b65-a9a7-c174651c2542/Feb_16_P21_Use_of_Focussed_US_in_EM.aspx [Accessed 13 Jun. 2019]

ASUM (2014) Policy B8 Statement on the Use of Ultrasound by Medical Practitioners. Crows Nest, NSW: ASUM 2014 (revised). [online] Available at: http://www2.asum.com.au/wp-content/uploads/2015/09/B8-Policy.pdf [Accessed 13 Jun. 2019]