



Ultrasound Prioritization

Effective Date: May 30, 2018

Scope

This guideline summarizes suggested wait times for common indications where ultrasound is the recommended first imaging test. The purpose is to inform primary care practitioners of how referrals are prioritized by radiologists, radiology departments and community imaging clinics across the province. This guideline is an adaptation of the British Columbia Radiological Society (BCRS) Ultrasound Prioritization Guidelines (2016). Management of the listed clinical problems is beyond the scope of this guideline. However, in some cases, notes and alternative tests are provided for additional clinical context. Primary care practitioners are encouraged to consult a radiologist if they have any concerns or questions regarding which is the appropriate imaging test to choose for a particular problem.

Background

The 2016 BCRS Ultrasound Prioritization Guidelines were developed to provide imaging departments with a consistent, provincial approach to prioritizing commonly ordered ultrasound tests according to suggested maximum wait times. The BCRS guidelines were developed by consensus and are based on best BC expert opinion with representation of radiologists from across the province. Several considerations apply:

- These are guidelines, and as such, are designed to apply in general terms. They are not intended to replace clinical judgement or physician-to-physician discussion.
- Prioritization levels were selected to match other similar guidelines for CT and MRI and are typically assigned by radiologists rather than referring physicians.
- These guidelines should not be applied rigidly to each case, as varying clinical factors may shift a particular indication from one priority level to another.
- Access to ultrasound and the ability to respond to emergent/urgent ultrasound requests will depend on local availability.
- The clinical topics included in this guideline represent broad examples, and do not encompass all possible scenarios or all requirements for ultrasound examinations.
- These guidelines do not apply to inpatients or emergency room patients.

Priority Level Definitions

The priority levels defined below (Table 1) are in alignment with the Canadian Association of Radiologist's national designation Five Point Classification System¹.

Table 1: Priority Level Definitions

Priority Level	Clinical Example	Maximum Suggested Wait Time
P1	An examination immediately necessary to diagnose and/or treat life-threatening disease. Such an examination will need to be done either stat or not later than the day of the request.	Immediately to 24 hours
P2	An examination indicated within one week of a request to resolve a clinical management imperative.	Maximum 7 calendar days
P3	An examination indicated to investigate symptoms of potential importance.	Maximum 30 calendar days
P4	An examination indicated for long-range management or for prevention.	Maximum 60 calendar days
P5	Timed follow-up exam or specified procedure date recommended by radiologist and/or clinician.	

Source: Adapted from the *Canadian Association of Radiologists National Maximum Wait Time Access Targets for Medical Imaging*.

Prioritization of Potential Diagnoses

The following potential diagnoses, where ultrasound is the recommended first test, are grouped according to system and then further subdivided into priority levels. For each system an overview table is presented followed by a more detailed table outlining additional notes and alternative tests where appropriate. Refer to [Appendix A: Ultrasound Prioritization Guideline Summary](#) for a one page summary of all potential diagnoses and prioritizations. Referring practitioners may consider noting the priority directly on the requisition.

► Abdomen and Pelvis

Abdomen and Pelvis: Overview				
P1	P2	P3	P4	P5
Immediately to 24 hours	Max 7 calendar days	Max 30 calendar days	Max 60 calendar days	Specified date
<ul style="list-style-type: none"> Acute abdominal pain (e.g., appendicitis, cholecystitis) Acute post-transplant assessment Splenic rupture Septic renal colic/focal pyelonephritis Acute painful hernia, (obstruction, strangulation, or ischemia suspected) Intra-abdominal abscess Painful jaundice Testicular torsion/epididymitis Testicular rupture Priapism 	<ul style="list-style-type: none"> Acute painful hernia, (obstruction, strangulation, or ischemia not suspected) Painless jaundice Pancreatitis, complications Painless hematuria Renal colic Acute renal failure New testicular mass New painless abdominal or pelvic mass 	<ul style="list-style-type: none"> Acute painless hernia/chronic hernia (if diagnosis in doubt) Extra-testicular mass Cholelithiasis New pulsatile abdominal mass Renal stone burden 	<ul style="list-style-type: none"> Chronic abdominal pain/bloating Abnormal liver function tests/known chronic liver disease Pre-transplant work-up Scrotal or pelvic ultrasound as part of workup for varicocele embolization/uterine artery embolization Peyronie's disease 	<ul style="list-style-type: none"> Known abdominal aortic aneurysm (AAA)/endovascular abdominal aortic aneurysm repair follow-up

Abdomen and Pelvis Table: Notes and Alternative Tests		
	Potential Diagnosis	Notes and Alternative Tests
P1	Acute abdominal pain (e.g., appendicitis, cholecystitis)	<ul style="list-style-type: none"> Choice of first-line test will depend on likely origin of pain and suspected clinical diagnosis, for example: <ul style="list-style-type: none"> If acute pancreatitis, suggest CT If bowel ischemia, suggest CT If ultrasound is equivocal for appendicitis, consider CT or MRI CT is not recommended for the evaluation of suspected appendicitis in children until after ultrasound has been considered as an option (Choosing Wisely Radiology recommendation)
	Acute post-transplant assessment	<ul style="list-style-type: none"> CT for liver transplant if ultrasound inconclusive
	Splenic rupture	<ul style="list-style-type: none"> CT is typically ordered as first-line imaging for trauma In pediatric and pregnant population, consider ultrasound as first-line
	Septic renal colic/focal pyelonephritis	<ul style="list-style-type: none"> In pediatric, young female and pregnant population consider ultrasound as first-line CT KUB (kidney/urinary/bladder) can be first-line for renal colic
	Acute painful hernia (obstruction, strangulation, or ischemia suspected)	<ul style="list-style-type: none"> If concern for bowel obstruction, consider plain film prior to ultrasound If ultrasound is inconclusive, CT can be used

Abdomen and Pelvis Table: Notes and Alternative Tests continued from page 2

	Potential Diagnosis	Notes and Alternative Tests
	Intra-abdominal abscess	
P1	Painful jaundice	
	Testicular torsion/epididymitis	
	Testicular rupture	• Associated with an episode of preceding scrotal trauma
	Priapism	• Typically referred by urology or emergency department to elucidate cause
P2	Acute painful hernia (obstruction, strangulation or ischemia not suspected)	• If ultrasound is inconclusive, CT can be used • For acute painless hernia, ultrasound is not recommended
	Painless jaundice	• CT is recommended for characterization if a mass is seen on ultrasound in the liver or pancreas
	Pancreatitis, complications	• To assess for fluid collections and to identify any underlying causes such as gallstones and/or common bile duct stones
	Painless hematuria	• Includes microscopic and macroscopic hematuria • Negative ultrasound still requires follow-up (consider CT)
	Renal colic	• Ultrasound is first-line imaging test in pediatric patients and pregnant women • Consider CT KUB (kidney/urinary/bladder) as first-line test in adults
	Acute renal failure	• To rule out obstructive uropathy
	New testicular mass	
New painless abdominal or pelvic mass	• CT is often considered first-line in this situation except in pediatrics • In rural and remote areas where CT may not be available, ultrasound is the first choice modality	
P3	Acute painless hernia/chronic hernia	• Generally no imaging is required, ultrasound may be ordered if diagnosis is in doubt
	Extra-testicular mass	• For example, to differentiate hydrocele, varicocele, epididymal cyst
	Cholelithiasis	
	New pulsatile abdominal mass	• Suspect previously undiagnosed abdominal aortic aneurysm (AAA)
	Renal stone burden	• May be supplemented with CT KUB (kidney/urinary/bladder) or KUB radiograph as needed
P4	Chronic abdominal pain/bloating	• If associated symptoms suggest potential malignancy, consider P3
	Abnormal liver function tests/ known chronic liver disease	• Includes non-alcoholic fatty liver disease (NALFLD) or other causes of chronic hepatitis • Includes screening for hepatocellular carcinoma (HCC) in patients with known Hep B/C or other risk factors • Interval follow-up may be recommended based on hepatology guidelines ²
	Pre-transplant work-up	• As indicated by pre-transplant orders • Urgency may be dictated by anticipated surgery date
	Scrotal or pelvic ultrasound as part of workup for varicocele embolization/uterine artery embolization	• Typically referred by specialists prior to procedure
	Peyronie's disease	• Typically referred by specialists
P5	Known abdominal aortic aneurysm/endovascular abdominal aortic aneurysm repair follow-up	• CT can be an alternative imaging test or if ultrasound is technically challenging • Timed follow-up, usually done yearly or per advice of vascular surgeon

► Pediatrics

Pediatrics: Overview			
P1	P2	P3	P4
Immediately to 24 hours	Max 7 calendar days	Max 30 calendar days	Max 60 calendar days
<ul style="list-style-type: none"> • Pyloric stenosis • Intussusception • Clinically suspicious intra-abdominal/pelvic mass 	<ul style="list-style-type: none"> • Increasing head circumference (hydrocephalus) • Biliary atresia as the cause of neonatal jaundice 	<ul style="list-style-type: none"> • Follow-up antenatal hydronephrosis 	<ul style="list-style-type: none"> • Developmental dysplasia of the hip (DDH) • Spine ultrasound (prior to 5 months of age) • Urinary tract infection • Chronic liver disease • Renal anomaly

Pediatrics: Notes and Alternative Tests		
	Potential Diagnosis	Notes and Alternative Tests
P1	Pyloric stenosis	
	Intussusception	
	Clinically suspicious intra-abdominal/pelvic mass	
P2	Increasing head circumference (Hydrocephalus)	<ul style="list-style-type: none"> • Providing the fontanelles are still open
	Biliary atresia as the cause of neonatal jaundice	<ul style="list-style-type: none"> • When jaundice is refractory or severe • Usually requested by pediatrician
P3	Follow-up antenatal hydronephrosis	<ul style="list-style-type: none"> • Refer to <i>Associated Document – BC Children’s Hospital Antenatal Hydronephrosis Imaging Guideline</i>
P4	Developmental dysplasia of the hip (DDH)	<ul style="list-style-type: none"> • P4 provided that requisition is sent in at birth, exam should be completed by 4–6 weeks • If requisition is sent later, DDH may become a P2 or P3 exam so that exam is completed by 4–6 weeks
	Spine ultrasound (prior to 5 months of age)	<ul style="list-style-type: none"> • Typically for dysraphism or cord tethering
	Urinary tract infection (UTI)	<ul style="list-style-type: none"> • For recurrent UTIs, to rule out or confirm bladder problems
	Chronic liver disease	<ul style="list-style-type: none"> • Or for cystic fibrosis liver evaluation
	Renal anomaly	

► Obstetrics and Gynecology

Obstetrics and Gynecology: Overview			
P1	P2	P3	P4
Immediately to 24 hours	Max 7 calendar days	Max 30 calendar days	Max 60 calendar days
<ul style="list-style-type: none"> • Ectopic pregnancy • Threatened abortion • Embryonic/fetal demise • Placental abruption • Vasa/vena previa • Pre-term labour to determine cervical length • Acute pelvic pain of suspected gynecological cause (e.g., query ruptured cyst, pelvic inflammatory disease, ovarian torsion) 	<ul style="list-style-type: none"> • Medical abortion • Polyhydramnios • Oligohydramnios • Follow-up of oligohydramnios (unless otherwise specified) • Intrauterine growth restriction • Post-dates fluid assessment • Intrauterine device localization with pain 	<ul style="list-style-type: none"> • Post-menopausal bleeding • Follow-up possible fetal abnormality from routine detail scan • High-risk pregnancy • Pelvic mass • Intrauterine device localization without symptoms or bleeding 	<ul style="list-style-type: none"> • Dysfunctional uterine bleeding e.g., fibroids, adenomyosis • Follow-up placental location • Adnexal cyst follow-up (unless otherwise specified) • Fetal detail exam (unless otherwise specified)

Obstetrics and Gynecology: Notes and Alternative Tests

	Potential Diagnosis	Notes and Alternative Tests
P1	Ectopic pregnancy	<ul style="list-style-type: none"> Indicated if clinically suspect pregnant, positive beta human chorionic gonadotropin (BHCG), or pain and/or bleeding regardless of BHCG level
	Threatened abortion	
	Embryonic/fetal demise³	
	Placental abruption	
	Vasa/vena previa	
	Pre-term labour to determine cervical length	<ul style="list-style-type: none"> Endovaginal ultrasound to be used if a transabdominal scan is inconclusive
	Acute pelvic pain of suspected gynecological cause (e.g., query ruptured cyst, pelvic inflammatory disease, ovarian torsion)	<ul style="list-style-type: none"> MRI can be used in selected cases if ultrasound is inconclusive and if locally available
P2	Medical abortion	<ul style="list-style-type: none"> To confirm intra-uterine pregnancy and gestational age prior to medical abortion⁴
	Polyhydramnios	
	Oligohydramnios	
	Follow-up of oligohydramnios	<ul style="list-style-type: none"> AFI (amniotic fluid index)/fluid volume unless otherwise specified i.e., patient has regularly scheduled checks for AFI
	Intrauterine growth restriction (IUGR)	<ul style="list-style-type: none"> Consider P5 as necessary
	Post-dates fluid assessment	<ul style="list-style-type: none"> Consider P5 as necessary
	Intrauterine device (IUD) localization with pain	
P3	Post-menopausal bleeding	<ul style="list-style-type: none"> Negative ultrasound should not interfere with further investigation to exclude malignancy
	Follow-up possible fetal abnormality from routine detail scan	<ul style="list-style-type: none"> Generally as suggested by perinatal specialist
	High-risk pregnancy	<ul style="list-style-type: none"> Follow-up amniotic fluid is P3 unless otherwise specified by radiologist and/or clinician (i.e., P2)
	Pelvic mass	<ul style="list-style-type: none"> Masses detected on pelvic exam include causes such as ovarian cysts and fibroids If symptomatic consider higher priority
	Intrauterine device (IUD) localization	<ul style="list-style-type: none"> If without symptoms or bleeding
P4	Dysfunctional uterine bleeding e.g., fibroids, adenomyosis	
	Follow-up placental location	<ul style="list-style-type: none"> If follow-up recommended, not indicated before 32 weeks. If the ultrasound is performed earlier (28–32 weeks) and placenta is found to be low lying, the ultrasound should be repeated at 32 weeks given the significant rate of growth between 28 and 32 weeks.
	Adnexal cyst follow-up (unless otherwise specified)	<ul style="list-style-type: none"> Interval follow-up may be recommended based on the Society of Radiologists in Ultrasound guidelines⁵
	Fetal detail exam (unless otherwise specified)	

► **Musculoskeletal/Extremity**

Musculoskeletal/Extremity: Overview				
P1	P2	P3	P4	P5
Immediately to 24 hours	Max 7 calendar days	Max 30 calendar days	Max 60 calendar days	Specified time
<ul style="list-style-type: none"> • Deep vein thrombosis • Septic arthritis/toxic synovitis • Abscess 	<ul style="list-style-type: none"> • Acute tendon tears 	<ul style="list-style-type: none"> • New palpable neck/thyroid mass • New palpable extremity mass • Acute rotator cuff tear 	<ul style="list-style-type: none"> • Synovitis/arthropathy follow-up • Tendinopathy, chronic shoulder pain, non-operative rotator cuff tear • Bursitis • Chronic palpable mass • Multi nodular goiter • Carpal tunnel syndrome or other neuropathy • Baker's cyst 	<ul style="list-style-type: none"> • Follow-up of soft tissue mass

Musculoskeletal/Extremity: Notes and Alternative Tests		
	Potential Diagnosis	Notes and Alternative Tests
P1	Deep vein thrombosis	<ul style="list-style-type: none"> • Correlate with D dimer if available
	Septic arthritis/toxic synovitis	<ul style="list-style-type: none"> • If effusion present, may prompt fine needle aspiration
	Abscess	<ul style="list-style-type: none"> • To confirm presence of fluid and exclude solid mass
P2	Acute tendon tears	<ul style="list-style-type: none"> • Typically achilles or biceps require emergent surgery or management • Except rotator cuff tears which typically are not surgical • Unless specified under P4
P3	New palpable neck/thyroid mass	<ul style="list-style-type: none"> • Thyroid ultrasound scan is not routinely recommended in patients with abnormal thyroid function tests, unless there is a palpable abnormality of the thyroid gland (Choosing Wisely Endocrinology and Metabolism Recommendation)
	New palpable extremity mass	<ul style="list-style-type: none"> • To determine if the mass is cystic or solid • If suspicious features on clinical exam or sonograph, CT or MRI may be recommended
	Acute rotator cuff tear	<ul style="list-style-type: none"> • As part of orthopedic referral or pre-surgical • MRI is an alternative test usually suggested by a radiologist if ultrasound is inconclusive, or ordered by a surgeon
P4	Synovitis/arthropathy follow-up	<ul style="list-style-type: none"> • Typically ordered by rheumatologists for patients on biologics for inflammatory arthritis
	Tendinopathy, chronic shoulder pain, non-operative rotator cuff tear	
	Bursitis	
	Chronic palpable mass	<ul style="list-style-type: none"> • E.g., differentiate lipoma, sebaceous cyst, or other
	Multi nodular goiter	<ul style="list-style-type: none"> • Follow-up studies can be used to confirm stability
	Carpal tunnel syndrome or other neuropathy	<ul style="list-style-type: none"> • May be useful if other diagnostic tests are equivocal • Usually requires specialist referral
	Baker's Cyst	<ul style="list-style-type: none"> • To confirm diagnosis and exclude alternate etiology
P5	Follow-up of soft tissue mass	<ul style="list-style-type: none"> • To confirm stability

► General

General: Overview				
P1	P2	P3	P4	P5
Immediately to 24 hours	Max 7 calendar days	Max 30 calendar days	Max 60 calendar days	Specified time
• Abscess	• Cancer staging or metastatic workup • New suspicious palpable mass			• Follow-up of breast mass

General: Notes and Alternative Tests		
	Potential Diagnosis	Notes and Alternative Tests
P1	Abscess	
P2	Cancer staging or metastatic workup	• CT is often the preferred modality
	New suspicious palpable mass	• E.g., new breast or lymph node mass
P5	Follow-up of breast mass	• To confirm stability. For additional guidance refer to BI-RADS ⁶ .

► Vascular

Vascular: Overview				
P1	P2	P3	P4	P5
Immediately to 24 hours	Max 7 calendar days	Max 30 calendar days	Max 60 calendar days	Specified time
	• Carotid ultrasound with acute stroke/transient ischemic attack symptoms		• Carotid doppler screening	• Follow-up of prior carotid surgery or stenting

Vascular: Notes and Alternative Tests		
	Potential Diagnosis	Notes and Alternative Tests
P2	Carotid ultrasound with acute stroke/transient ischemic attack symptoms	• CT head and computed tomography angiography (CTA) is obligatory for acute stroke assessment but carotid ultrasound is a useful supplementary test • Carotid ultrasound may be used to clarify the degree of stenosis if a large amount of calcified plaque is present on CTA limiting assessment or if a bruit has been heard
P4	Carotid doppler screening	• For patients with high risk factors or bruit
P5	Follow-up of prior carotid surgery or stenting	

Resources

- Canadian Association of Radiology *Diagnostic Imaging Referral Guidelines* (2012) www.car.ca/en/standards-guidelines/guidelines.aspx
- American College of Radiology Appropriateness Criteria www.acr.org/Quality-Safety/Appropriateness-Criteria
- Society of Radiologists in Ultrasound <http://www.sru.org>
- Choosing Wisely Radiology Recommendations:
Radiology: choosingwiselycanada.org/radiology/
Endocrinology and Metabolism: choosingwiselycanada.org/endocrinology-and-metabolism/

► Appendices

Appendix A: Ultrasound Prioritization Guideline Summary

www2.gov.bc.ca/assets/gov/health/practitioner-pro/bc-guidelines/ultrasound-summary.pdf

► Associated Documents

- BC Children's Hospital Antenatal Hydronephrosis Imaging Guideline Algorithm:
www.childhealthbc.ca/sites/default/files/BCCH_Antenatal%20Hydronephrosis%20Imaging%20Guideline%202015.PDF
 - o Preamble to algorithm: www.childhealthbc.ca/sites/default/files/BCCH_Antenatal%20Hydronephrosis%20Imaging%20Guideline%20Preamble%2008%20April2015.pdf

► References

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2. Heimbach J, Kulik LM, Finn R, et al. AASLD guidelines for the treatment of hepatocellular carcinoma. *Hepatology*. 2017; Jan 28. [Epub ahead of print].
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5. Levine D, Brown D, Andreotti RF et al. Management of Asymptomatic Ovarian and Other Adnexal Cysts Imaged at US: Society of Radiologists in Ultrasound Consensus Conference Statement. *Ultrasound Quarterly*. 2010;26(3):121-131.
6. Mendelson EB, Böhm-Vélez M, Berg WA, et al. ACR BI-RADS® Ultrasound. In: ACR BI-RADS® Atlas, Breast Imaging Reporting and Data System. Reston, VA, American College of Radiology; 2013.

This guideline is based on expert BC clinical practice current as of the Effective Date. This guideline was developed by the Guidelines and Protocols Advisory Committee based on the *British Columbia Radiological Society Ultrasound Prioritization Guidelines* (2016), and approved by the Medical Services Commission.

THE GUIDELINES AND PROTOCOLS ADVISORY COMMITTEE

The principles of the Guidelines and Protocols Advisory Committee are to:

- encourage appropriate responses to common medical situations
- recommend actions that are sufficient and efficient, neither excessive nor deficient
- permit exceptions when justified by clinical circumstances

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