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SARS-CoV-2 Survivors With Chronic Health Conditions: A Pilot Study on "COVID Long-Haulers"

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https://doi.org/10.1177/87564793221100259

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Abstract

Objective:

As the global pandemic resulting from this virus continues, surviving patients continue to report chronic symptoms long after a diagnosis of coronavirus disease (COVID-19). A pilot study was conducted with a convenient sample to ascertain the proper diagnostic testing for detecting chronic disease.

Materials and Methods:

A convenient group of nine patients were directed by their primary care physician to be evaluated based on a variety of symptoms being reported by those surviving the acute phase of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The patients who volunteered provided sonographic imaging data of the lungs, kidney, and heart. This modified sonographic assessment was completed in a Family Practice office, with a laptop ultrasound equipment system, a blood draw, as well as completion of the EuroQol (EQ-5D) questionnaire. The data were collected as part of the patients 3- to 4-month follow-up primary care visit.

Results:

In this cohort, six patients were diagnosed and were able to recover at home. The other three patients chose to undergo monoclonal antibody therapy. The two subgroups' data are provided and describe the types of residual effects that some individuals continue to suffer.

Conclusion:

Those patients with residual symptoms of SARS-CoV-2 have been dubbed "COVID long-haulers." This combination of diagnostic tests, specifically renal sonography, flow cytometry, and dynamic sonographic assessment, may hold promise for guiding the treatment and surveillance of these patients.

Keywords

ORIGINAL CONTRIBUTION | ARTICLES IN PRESS

Optimizing Lung Ultrasound: The Effect of Depth, Gain and Focal Position on Sonographic B-Lines

Nicole M. Duggan • Andrew J. Goldsmith • Ahad Alhassan Al Saud • Irene W.Y. Ma • Hamid Shokoohi • Andrew S. Liteplo

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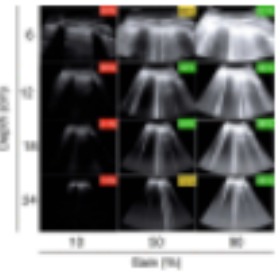
Abstract

Ultrasonographic B-lines are artifacts present in alveolar-interstitial syndromes. We prospectively investigated optimal depth, gain, focal position and transducer type for B-line visualization and image quality. B-Lines were assessed at a single rib interspace with curvilinear and linear transducers. Video clips were acquired by changing parameters: depth (6, 12, 18 and 24 cm for curvilinear transducer, 4 and 8 cm for linear transducer), gain (10%, 50% and 90%) and focal position (at the pleural line or half the scanning depth). Clips were scored for B-lines and image quality. Five hundred sixteen clips were obtained and analyzed. The curvilinear transducer improved B-line visualization (63% vs. 37%, $p < 0.0001$), with higher image quality (3.52 ± 0.71 vs. 3.31 ± 0.86, $p = 0.0047$) compared with the linear transducer. B-Lines were better visualized at higher gains (curvilinear: gain of 50% vs. 10%, odds ratio = 7.04, 95% confidence interval: 4.03–12.3; gain of 90% vs. 10%, odds ratio = 9.48, 95% confidence interval: 5.28–17.0) and with the focal point at the pleural line (odds ratio = 1.64, 95% confidence interval: 1.02–2.63). Image quality was highest at 50% gain ($p = 0.02$) but decreased at 90% gain ($p < 0.0001$) and with the focal point at the pleural line ($p < 0.0001$). Image quality was highest at depths of 12–18 cm. B-Lines are best visualized using a curvilinear transducer with at least 50% gain and focal position at the pleural line. Gain less than 90% and image depth between 12 and 18 cm improve image quality.



Optimizing Lung Ultrasound: The Effect of Depth, Gain and Focal Position on Sonographic B-Lines

Nicole M. Duggan, Andrew J. Goldsmith, Ahad Alhassan Al Saud, Irene W.Y. Ma, Hamid Shokoohi, Andrew S. Liteplo

Published online: May 05, 2022

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Hyperechoic pancreas on ultrasonography: an analysis of its severity and clinical implications

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Purpose: This study investigated risk factors for hyperechoic pancreas (HP) on ultrasonography (US) according to HP severity.

Methods: Between December 2008 and February 2014, 1,459 subjects who underwent abdominal US as part of health examinations were retrospectively included. Two radiologists assessed and categorized the severity of HP as normal, mild, moderate, and severe. Subjects were allocated to two groups as follows: fatty pancreas 1 (FP1; mild to severe HP) and fatty pancreas 2 (FP2; moderate to severe HP). Clinico-metabolic parameters such as the body mass index and blood test profile of subjects with normoglycemia and prediabetes/diabetes were compared (normal vs. FP1; normal or mild HP vs. FP2). Logistic regression analysis was used to evaluate the associations between HP, nonalcoholic fatty liver disease (NAFLD), and diabetes/prediabetes with adjustment for clinico-metabolic parameters.

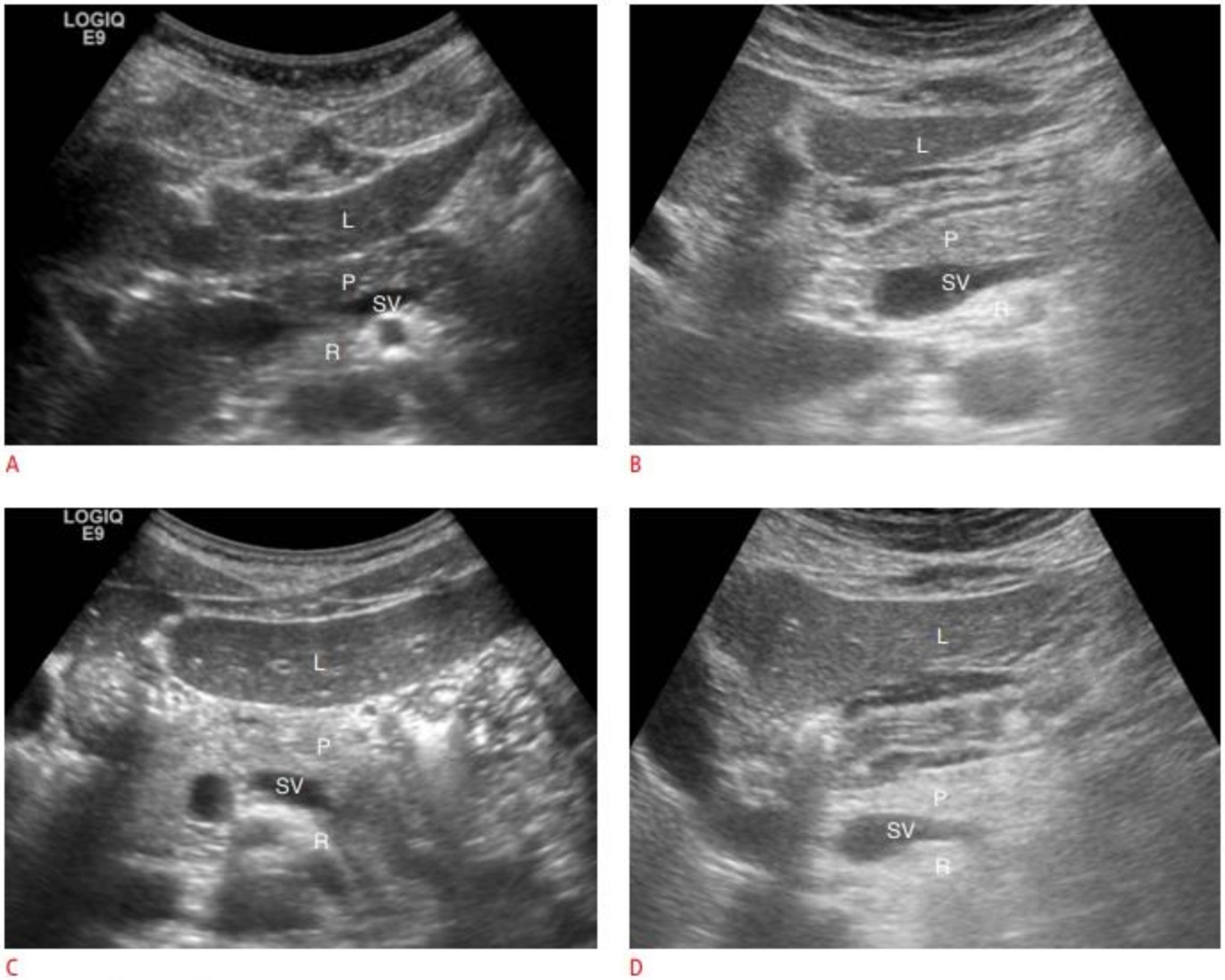

Fig. 2. **Classification of pancreatic echogenicity on abdominal ultrasound.**
The pancreas is detected in the anterior aspect of the splenic vein. A. Abdominal ultrasonography shows non-fatty pancreas; similar to the echogenicity of the liver. B. Mild degree of hyperechoic pancreas shows slightly increased echogenicity compared to the echogenicity of the liver. C. Moderate degree of hyperechoic pancreas shows definite increased echogenicity, but lower than that of retroperitoneal fat. D. Severe degree of hyperechoic pancreas shows similar to or higher than the echogenicity of retroperitoneal fat. P, pancreas; L, left hemiliver; R, retroperitoneal fat; SV, splenic vein.

NAFLD and prediabetes/diabetes were significantly associated with HP diagnosed using US. Additionally, moderate to severe HP was found to be a better predictor of prediabetes/ diabetes than more than mild HP. Therefore, evaluating the severity of HP may be useful in clinical practice.

ORIGINAL ARTICLE

Renal Cortical Elastography: Normal Values and Variations

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KEYWORDS
Renal elastography,
Ultrasound,
Shear wave elastography

Abstract *Introduction:* Renal cortical elastography has shown conflicting but promising results in evaluation of chronic kidney disease and other renal disorders. The purpose of this study was to establish a normogram of renal cortical elasticity values and assess their variation between right and left kidney and their relation with age, gender, body mass index, renal dimensions and skin to cortex distance.
Methods: The study was a hospital based cross sectional study performed at Tribhuvan University Teaching Hospital, a tertiary care center in Kathmandu, Nepal. All individuals referred for Ultrasound from General Health Check up clinic were included in the study. Patient with abnormal ultrasound findings and abnormal renal function test were excluded from the study. Renal morphometry including length, cortical thickness, and skin to cortex distance were measured in B mode imaging and renal cortical elastography was measured with region of interest box of 1 × 0.5 cm. All analyses were done using Statistical Package for Social Sciences 20.0 soft ware.
Results: A total of 95 individuals who met the inclusion criteria were included in the study. The mean values of right and left renal cortical shear wave velocity were 1.49 ± 0.19 m/s and 1.54 ± 0.19 m/s respectively. Statistical significant difference was observed between the renal cortical shear wave velocity of right and left kidney. The renal shear wave velocity was seen to decrease with age, however the correlation was not statistically significant. No significant difference was also noted in renal shear wave velocity among various sex or Body mass index groups. Statistically significant negative correlation was noted between skin to cortex distance and renal cortical shear wave velocities. However no statistically significant correlation was noted between renal dimensions and renal cortical shear wave velocities.

Figure 1 Measurement of renal cortical elasticity. ROI box is seen placed in the renal cortex parallel to the renal pyramids (marked hypoechoic triangular area) and not extending up to the renal sinus (hyperechoic area). The shear wave velocity in m/s is displayed in the lower left corner.

Table 1 Kidney dimensions and skin to cortex distance.

Dimensions (cm)	Right kidney	Left kidney	p-value#
Length	9.76 ± 0.78	10.02 ± 0.90	0.021*
Width	4.21 ± 0.55	4.64 ± 0.67	<0.001*
Parenchymal thickness	1.86 ± 0.28	2.06 ± 0.34	<0.001*
Cortical thickness	1.27 ± 0.20	1.38 ± 0.26	0.001*
Skin to cortex distance	3.66 ± 0.96	3.52 ± 1.01	0.085

Obtained using paired sample t-test, * statistically significant.

Table 2 Shear wave velocities according to BMI groups.

BMI groups	18.5 to <23 (normal BMI)	23 to <27.5 (overweight)	>27.5 (obese)	P-value#
Right kidney SWV (m/s)	1.54 ± 0.20	1.47 ± 0.16	1.49 ± 0.24	0.284
Left kidney SWV (m/s)	1.54 ± 0.17	1.57 ± 0.18	1.48 ± 0.23	0.226

Obtained using one way ANOVA.

Conclusions

The normal cortical elasticity values in terms of shear wavevelocity of right and left kidney were established. Leftkidney has higher cortical shear wave velocity compared tothe right kidney and as the skin to cortex distance increasesthe shear wave velocity decreases. Renal elasticity is in-dependent of the age, gender, BMI and renal dimensions.Future larger population based studies with standardizedprotocol and correlation with renal perfusion needs to beconducted to establish the normal values of renal cortical elasticity.

Giant Fibrous Polyp of the Gallbladder Showing a Periphery-Dominant Contrast Enhancement: How to Differentiate It From Early Carcinoma

Taketoshi Fujimoto, MD, PhD, SJSUM, Yo Kato, MD, PhD

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Article information

Abstract

Although polyp size and stalk diameter are significant for the differential diagnosis of a gallbladder polyp, it is necessary to catch genuine polyp characteristics to differentiate a giant fibrous polyp from gallbladder carcinoma (GBC). This case report analyses the images and their correlation with the pathology. Transabdominal sonography revealed gallstones and a giant pedunculated gallbladder polyp measuring 32 × 18 × 14 mm with a thick stalk. The polyp lacked a hyperechoic surface line and was not delineated by either a deep hypoechoic area or a conically thickened outermost hyperechoic layer. Contrast-enhanced ultrasonography (CEUS) depicted a periphery-dominant enhancement, during the post vascular phase. A noncontrast computed tomogram (CT) did not demonstrate a gallbladder mass; meanwhile, a dynamic study revealed an enhanced polyp showing a periphery-dominant enhancement. Hence, without diagnostic findings suggestive of an obvious advanced GBC or excluding an early GBC, a full-thickness laparoscopic cholecystectomy was performed. The histopathology demonstrated a fibrous polyp with a thick stalk. In conclusion, a giant gallbladder polyp with a thick stalk showing a periphery-dominant contrast enhancement could suggest a fibrous polyp.

Keywords

gallbladder, fibrous polyp, gallbladder carcinoma, ultrasound, computed tomography

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Original Article

Three-Dimensional Ultrasound Evaluation of Pelvic Floor Muscle Contraction in Women Affected by Deep Infiltrating Endometriosis

Application of a Quick Contraction Scale

Alessandro Arena MD, Eugenia Degli Esposti MD, Laura Cocchi MD, Benedetta Orsini MD, Jacopo Lenzi PhD, Simona Del Forno MD, PhD, Diego Raimondo MD, PhD, Aly Youssef MD, PhD, Renato Seracchioli MD

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The authors have nothing to declare and no interests to disclose. No funding was received for this study.

Objectives

Using transperineal 3D/4D ultrasound, we evaluated the prevalence of the various categories of a 4-point pelvic contraction scale among women affected by ovarian endometriosis (OE), deep infiltrating endometriosis (DIE), and healthy controls.

Methods

This prospective study was conducted on nulliparous women scheduled for surgery to remove endometriosis, and nulliparous healthy volunteers who did not show any clinical or sonographic signs of endometriosis, who served as controls. Patients were subjected to 3D/4D transperineal ultrasound obtaining measurements of the antero-posterior diameter (APD), both at rest and during maximal pelvic floor muscle (PFM) contraction (PFMC). The difference of APD from rest to maximal PFMC was then calculated as percent change from baseline (ΔAPD) and patients were thus categorized using the 4-point pelvic contraction scale.

Results

One hundred sixty-four patients were considered for the study. Mean difference in APD between relaxed state and maximal PFMC was 23.3 ± 7.9% (range 2.4–40.0) in controls, 20.5 ± 9.0% (range 0.0–37.3) in patients with OE, and 14.6 ± 10.4% (range 0.0–37.1) in patients with DIE (*F*-test = 19.5, *P*-value < .001). A significant negative correlation was found between the contraction scale and dyspareunia (rs = −0.17, *P* = .032), and it appeared to be stronger among patients with DIE (rs = −0.20, *P* = .076).

Conclusions

PFM function in endometriotic patients could be assessed reliably through this 4-point scale. The rapid identification of women suffering from PFM dysfunction, along with deep dyspareunia, could enable gynecologists to offer them additional therapies, such as PFM rehabilitation.

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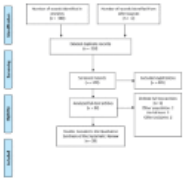

Pulmonary Ultrasound in the Diagnosis and Monitoring of Coronavirus Disease (COVID-19): A Systematic Review

Ultrasound in Medicine and Biology, Vol. 47, Issue 8, p1997–2005, Published online: April 20, 2021

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ABSTRACT ONLY | VOLUME 43, SUPPLEMENT 1, S108, JANUARY 01, 2017

Gas as a Sign of Critical Illness in Abdominal Diseases

Dieter Nuernberg

DOI: https://doi.org/10.1016/j.ultrasmedbio.2017.08.1309 · Check for updates

Article Info

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Gas normally only occurs in the gastrointestinal system. Gas in the free abdominal compartment is a sign of perforation. But gas sometimes can also be seen in parenchymal organs (as abscess or covered perforation), also in the retroperitoneal room and very seldom in the wall of bowel or in vessels. Gas at wrong places (extragastral and extraintestinal) is an important sign in gastrointestinal diseases.

Perforation of the GIT is occurring very rarely (1-2%). Most frequently it is caused by ulcers of the stomach and the duodenum. X-ray, sonography and endoscopy are most important in the diagnosis of this complication. X-ray is fairly reliable in detecting air but needs a greater emission of gas. Given optimal conditions during the examination ultrasound can detect small amounts of air (1-2 ml). In daily routine sensitivity of this method is low (approx. 50 %). The diagnosis of a covered perforation is very complicated as it is lacking the typical criteria of free air in X-ray and sonography.

Patients with strong epigastric pain who were suspected to have a perforation were examined by ultrasound before and after undergoing endoscopy. We payed special attention to the presence of criteria of free air as well as any sonographical changes in the surrounding of the stomach.

The detection of free air by sonography sometimes is better after endoscopy. A covered perforation can only be visualized by enhancement of air. Criteria of a covered perforation are: *Echogenuous enhancement of a strictly limited cavity of perforation. *Reverberations of air within the cavity. *Detection of the leakage. (Orifice of perforation) *Detection of air motion. *Change of sonographical image after second look sonography.

The detection of a free or a covered perforation by endoscopy and other imaging methods is complicated. Second look sonography after insufflation of air by endoscopy can be useful and shows sometimes the perforation cavity. Under optimal conditions even the leakage can be visualized. The principle of a complementary sonography is little incriminatory. It provides the examiner with additional information, especially in a diagnostic procedure that is marked by a pressure of time.

Gas in abdominal organs is a sign of abscess. Abscesses with gas can also occur between the bowel loops as interenteric abscesses. Gas in abdominal vessels can occur in situation of sepsis.

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REVIEW | ARTICLES IN PRESS

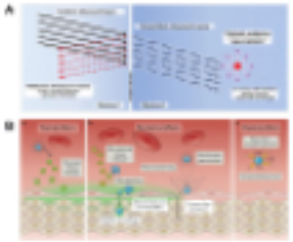
Next-Generation Colloidal Materials for Ultrasound Imaging Applications

Mark Louis P. Vidallon • Boon Mian Teo • Alexis I. Bishop • Rico F. Tabor

Published: May 28, 2022 • DOI: https://doi.org/10.1016/j.ultrasmedbio.2022.04.001

Abstract

Ultrasound has important applications, predominantly in the field of diagnostic imaging. Presently, colloidal systems such as microbubbles, phase-change emulsion droplets and particle systems with acoustic properties and multiresponsiveness are being developed to address typical issues faced when using commercial ultrasound contrast agents, and to extend the utility of such systems to targeted drug delivery and multimodal imaging. Current technologies and increasing research data on the chemistry, physics and materials science of new colloidal systems are also leading to the development of more complex, novel and application-specific colloidal assemblies with ultrasound contrast enhancement and other properties, which could be beneficial for multiple biomedical applications, especially imaging-guided treatments. In this article, we review recent developments in new colloids with applications that use ultrasound contrast enhancement. This work also highlights the emergence of colloidal materials fabricated from or modified with biologically derived and bio-inspired materials, particularly in the form of biopolymers and biomembranes. Challenges, limitations, potential developments and future directions of these next-generation colloidal systems are also presented and discussed.



Next-Generation Colloidal Materials for Ultrasound Imaging Applications

Mark Louis P. Vidallon, Boon Mian Teo, Alexis I. Bishop, Rico F. Tabor

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