WEBVTT

00:00:00.000 --> 00:00:03.570 Hi, my name is Julie Leviter.

00:00:03.570 --> 00:00:05.480 I'm an assistant professor of

00:00:05.480 --> 00:00:07.008 clinical Pediatrics at Yale

00:00:07.008 --> 00:00:08.519 University School of Medicine.

00:00:08.520 --> 00:00:12.167 Let's talk about the pediatric rush exam.

00:00:12.170 --> 00:00:14.010 Let's start with a case.

00:00:14.010 --> 00:00:16.770 We have a 6 month old boy presenting

00:00:16.770 --> 00:00:18.410 with fussiness and grunting.

00:00:18.410 --> 00:00:20.240 Here are his vital signs.

00:00:20.240 --> 00:00:23.345 He looks ill and he is pale and you

00:00:23.345 --> 00:00:26.120 identify correctly that he is in shock.

00:00:26.120 --> 00:00:27.965 But the question is what

00:00:27.965 --> 00:00:30.150 type of shock is he in?

00:00:30.150 --> 00:00:32.369 And we're going to use Pocus to

NOTE Confidence: 0.95403934

00:00:32.369 --> 00:00:34.559 help us narrow our differential.

NOTE Confidence: 0.981876

00:00:36.930 --> 00:00:38.666 Let's talk first broadly

NOTE Confidence: 0.981876

00:00:38.666 --> 00:00:40.836 about the types of shock.

NOTE Confidence: 0.981876

00:00:40.840 --> 00:00:43.444 So here on the left hand

NOTE Confidence: 0.981876

00:00:43.444 --> 00:00:45.180 column we have hypovolemic,

NOTE Confidence: 0.981876

00:00:45.180 --> 00:00:48.320 cardiogenic obstructive and distributive.

NOTE Confidence: 0.981876

00:00:48.320 --> 00:00:51.589 And then in each of these columns,

NOTE Confidence: 0.981876

00:00:51.590 --> 00:00:54.386 we're going to find the pokus

NOTE Confidence: 0.981876

00:00:54.386 --> 00:00:57.658 findings for each of the heart IVC,

NOTE Confidence: 0.981876

00:00:57.660 --> 00:01:00.519 abdomen, and lungs.

NOTE Confidence: 0.981876

00:01:00.520 --> 00:01:02.260 In the right hand column,

NOTE Confidence: 0.981876

00:01:02.260 --> 00:01:04.288 now you see the differential for

NOTE Confidence: 0.981876

00:01:04.288 --> 00:01:06.070 each different type of shock,

NOTE Confidence: 0.981876

00:01:06.070 --> 00:01:09.148 and we're going to figure out how we can

NOTE Confidence: 0.981876

00:01:09.148 --> 00:01:12.366 use focus to to narrow our differential.

NOTE Confidence: 0.981876

00:01:12.370 --> 00:01:15.331 And figure out how to best treat

NOTE Confidence: 0.981876

00:01:15.331 --> 00:01:18.320 our patient in the acute setting.

NOTE Confidence: 0.981876

00:01:18.320 --> 00:01:20.036 Let's go back to our case.

NOTE Confidence: 0.981876

00:01:20.040 --> 00:01:22.035 In this six month old in shock,

NOTE Confidence: 0.981876

00:01:22.040 --> 00:01:23.750 we started with a cardiac ultrasound.

NOTE Confidence: 0.9092748

00:01:26.510 --> 00:01:29.710 This is a phased array probe with the

NOTE Confidence: 0.9092748

00:01:29.710 --> 00:01:32.727 probe marker pointed toward the right

NOTE Confidence: 0.9092748

00:01:32.727 --> 00:01:35.392 shoulder in a parasternal Longview.

NOTE Confidence: 0.9092748

00:01:35.400 --> 00:01:37.806 Here are the different chambers seen

NOTE Confidence: 0.9092748

00:01:37.806 --> 00:01:39.950 the left ventricle left atrium,

NOTE Confidence: 0.9092748

00:01:39.950 --> 00:01:42.440 right ventricle and aortic outflow tract.

NOTE Confidence: 0.9092748

00:01:42.440 --> 00:01:44.510 Let's go through this systematically.

NOTE Confidence: 0.9092748

00:01:44.510 --> 00:01:47.238 So in this view we can look for

NOTE Confidence: 0.9092748

00:01:47.238 --> 00:01:49.889 a fusion ejection and equality.

NOTE Confidence: 0.9092748

00:01:49.890 --> 00:01:52.543 Let's first talk about ejection fraction so

NOTE Confidence: 0.9092748

00:01:52.543 --> 00:01:55.689 that LV has very poor ejection fraction.

NOTE Confidence: 0.9092748

00:01:55.690 --> 00:01:58.609 Here I would say about 15% in

NOTE Confidence: 0.9092748

00:01:58.609 --> 00:01:59.926 terms of effusion,

NOTE Confidence: 0.9092748

00:01:59.926 --> 00:02:03.043 even though there's a small small sliver

NOTE Confidence: 0.9092748

00:02:03.043 --> 00:02:05.836 of a black line at the posterior.

NOTE Confidence: 0.9092748

00:02:05.840 --> 00:02:08.024 Of the heart here I would say there's

NOTE Confidence: 0.9092748

00:02:08.024 --> 00:02:09.730 no significant pericardial effusion,

NOTE Confidence: 0.9092748

00:02:09.730 --> 00:02:12.970 and I don't see any signs of RV strain here.

NOTE Confidence: 0.9092748

00:02:12.970 --> 00:02:16.228 Let's look at the next slide.

NOTE Confidence: 0.9092748

00:02:16.230 --> 00:02:18.456 So this is a parasternal short

NOTE Confidence: 0.9092748

00:02:18.456 --> 00:02:20.979 view with the probe marker pointed

NOTE Confidence: 0.9092748

00:02:20.979 --> 00:02:23.369 toward the patients right hip.

NOTE Confidence: 0.9092748

00:02:23.370 --> 00:02:26.163 Here we see the left ventricle and

NOTE Confidence: 0.9092748

00:02:26.163 --> 00:02:28.829 again evidence of very poor squeeze,

NOTE Confidence: 0.9092748

00:02:28.830 --> 00:02:29.634 about 15%.

NOTE Confidence: 0.9092748

00:02:29.634 --> 00:02:32.046 Still no design or signs of

NOTE Confidence: 0.9092748

00:02:32.046 --> 00:02:33.450 right ventricle strain.

NOTE Confidence: 0.95930535

00:02:35.870 --> 00:02:38.966 And here we're looking at the IVC view.

NOTE Confidence: 0.95930535

00:02:38.970 --> 00:02:42.074 So we're going to look for signs of

NOTE Confidence: 0.95930535

00:02:42.074 --> 00:02:43.466 collapse, ability with inspiration.

NOTE Confidence: 0.95930535

00:02:43.466 --> 00:02:45.790 And here I would say it looks

NOTE Confidence: 0.95930535

00:02:45.853 --> 00:02:48.068 fairly plethoric that it's not

NOTE Confidence: 0.95930535

00:02:48.068 --> 00:02:49.840 really collapsing with respiration.

NOTE Confidence: 0.936436

00:02:53.330 --> 00:02:55.927 So here I've labeled the IVC and

NOTE Confidence: 0.936436

00:02:55.927 --> 00:02:58.773 this is going to tell us that we

NOTE Confidence: 0.936436

00:02:58.773 --> 00:03:01.024 really need to be very judicious

NOTE Confidence: 0.936436

00:03:01.024 --> 00:03:03.579 with fluids in this patient.

NOTE Confidence: 0.936436

00:03:03.580 --> 00:03:07.909 So what type of shock did this patient have?

NOTE Confidence: 0.936436

00:03:07.910 --> 00:03:09.700 This patient had cardiogenic shock.

NOTE Confidence: 0.936436

00:03:09.700 --> 00:03:11.480 The heart was hypo dynamic.

NOTE Confidence: 0.936436

00:03:11.480 --> 00:03:12.916 The IVC was plethoric.

NOTE Confidence: 0.936436

00:03:12.916 --> 00:03:15.759 We didn't look in the abdomen or lungs,

NOTE Confidence: 0.936436

00:03:15.760 --> 00:03:18.416 but if we looked in the abdomen it

NOTE Confidence: 0.936436

00:03:18.416 --> 00:03:21.015 probably would have been normal and if we

NOTE Confidence: 0.936436

00:03:21.015 --> 00:03:23.987 looked in the lungs we might have seen

NOTE Confidence: 0.936436

00:03:23.987 --> 00:03:26.052 signs of alveolar interstitial syndrome

NOTE Confidence: 0.936436

00:03:26.052 --> 00:03:28.969 or AI S where we would see beelines.

NOTE Confidence: 0.936436

00:03:28.970 --> 00:03:33.056 The diagnosis here was heart failure.

NOTE Confidence: 0.936436

00:03:33.060 --> 00:03:35.209 Our next patient is a 15 year

NOTE Confidence: 0.936436

00:03:35.209 --> 00:03:36.900 old gentleman with chest pain.

NOTE Confidence: 0.936436

00:03:36.900 --> 00:03:38.712 He had chest pain and shortness

NOTE Confidence: 0.936436

00:03:38.712 --> 00:03:40.420 of breath starting this morning,

NOTE Confidence: 0.936436

00:03:40.420 --> 00:03:41.700 no fevers, nausea, vomiting,

NOTE Confidence: 0.936436

00:03:41.700 --> 00:03:42.980 or upper respiratory symptoms.

NOTE Confidence: 0.936436

00:03:42.980 --> 00:03:45.220 His vitals are as you see here.

NOTE Confidence: 0.936436

00:03:45.220 --> 00:03:46.948 He appears short of breath clutching

NOTE Confidence: 0.936436

00:03:46.948 --> 00:03:49.213 his chest and he has decreased breath

NOTE Confidence: 0.936436

00:03:49.213 --> 00:03:50.978 sounds in the right hemithorax.

NOTE Confidence: 0.936436

00:03:50.980 --> 00:03:53.540 So what would you like to do first?

NOTE Confidence: 0.976283

00:03:56.150 --> 00:03:58.215 Let's go ahead and take our linear

NOTE Confidence: 0.976283

00:03:58.215 --> 00:04:00.302 probe in the longitudinal axis at

NOTE Confidence: 0.976283

00:04:00.302 --> 00:04:02.564 the 3rd to 4th intercostal space,

NOTE Confidence: 0.976283

00:04:02.570 --> 00:04:04.761 and you can put the depth at

NOTE Confidence: 0.976283

00:04:04.761 --> 00:04:06.500 about 4 centimeters unless they

NOTE Confidence: 0.976283

00:04:06.500 --> 00:04:08.320 have an obese body habitus.

NOTE Confidence: 0.9533522

00:04:12.550 --> 00:04:14.993 So here's what we see in the

NOTE Confidence: 0.9533522

00:04:14.993 --> 00:04:17.099 left and right lung fields.

NOTE Confidence: 0.9533522

00:04:17.100 --> 00:04:20.043 So in the left lung field you see here

NOTE Confidence: 0.9533522

00:04:20.043 --> 00:04:22.780 ribbon pleura and there's lung sliding.

NOTE Confidence: 0.9533522

00:04:22.780 --> 00:04:26.371 You see that nice ants analogue appearance

NOTE Confidence: 0.9533522

00:04:26.371 --> 00:04:29.340 where there's movement along the pleura.

NOTE Confidence: 0.9533522

00:04:29.340 --> 00:04:31.690 On the right side here.

NOTE Confidence: 0.9533522

00:04:31.690 --> 00:04:33.980 You see the ribbon pleura

NOTE Confidence: 0.9533522

00:04:33.980 --> 00:04:35.812 and the pleural line.

NOTE Confidence: 0.9533522

00:04:35.820 --> 00:04:39.308 There's no motion so this is very

NOTE Confidence: 0.9533522

00:04:39.308 --> 00:04:42.278 concerning for a pneumo thorax.

NOTE Confidence: 0.9533522

00:04:42.280 --> 00:04:44.808 Now we can go ahead and look for

NOTE Confidence: 0.9533522

00:04:44.808 --> 00:04:47.557 the lung point as well to see where

NOTE Confidence: 0.9533522

00:04:47.557 --> 00:04:49.941 in the thorax the pneumo thorax

NOTE Confidence: 0.9533522

00:04:49.941 --> 00:04:52.773 ends and meets the ventilated lung,

NOTE Confidence: 0.9533522

00:04:52.780 --> 00:04:54.976 but this patient had no lung

NOTE Confidence: 0.9533522

00:04:54.976 --> 00:04:56.910 point on the right side,

NOTE Confidence: 0.9533522

00:04:56.910 --> 00:05:00.190 indicating a substantial pneumo thorax.

NOTE Confidence: 0.9533522

00:05:00.190 --> 00:05:02.910 We can also use M mode to differentiate

NOTE Confidence: 0.9533522

00:05:02.910 --> 00:05:04.989 normal lung versus pneumothorax.

NOTE Confidence: 0.9533522

00:05:04.990 --> 00:05:07.933 So in the left lung here we see the

NOTE Confidence: 0.9533522

00:05:07.933 --> 00:05:10.198 seizure sign indicating a normally

NOTE Confidence: 0.9533522

00:05:10.198 --> 00:05:12.982 ventilated lung in the right lung.

NOTE Confidence: 0.9533522

00:05:12.990 --> 00:05:15.622 We have the barcode sign indicating a

NOTE Confidence: 0.9533522

00:05:15.622 --> 00:05:17.789 pneumothorax or lack of ventilation.

NOTE Confidence: 0.9533522

00:05:17.790 --> 00:05:19.932 So in this patient before an

NOTE Confidence: 0.9533522

00:05:19.932 --> 00:05:22.190 X ray was even obtained,

NOTE Confidence: 0.9533522

00:05:22.190 --> 00:05:24.190 the patient was moved into

NOTE Confidence: 0.9533522

00:05:24.190 --> 00:05:25.790 the critical care Bay.

NOTE Confidence: 0.9533522

00:05:25.790 --> 00:05:27.790 A needle decompression was performed.

NOTE Confidence: 0.9533522

00:05:27.790 --> 00:05:29.430 Pediatric surgery was consulted

NOTE Confidence: 0.9533522

00:05:29.430 --> 00:05:30.250 and preparations.

NOTE Confidence: 0.9533522

00:05:30.250 --> 00:05:32.270 Were made for procedural sedation

NOTE Confidence: 0.9533522

00:05:32.270 --> 00:05:34.696 and angsty lysis so that a

NOTE Confidence: 0.9533522

00:05:34.696 --> 00:05:36.376 chest tube could be placed.

NOTE Confidence: 0.9533522

00:05:36.380 --> 00:05:38.282 The chest X ray confirmed the

NOTE Confidence: 0.9533522

00:05:38.282 --> 00:05:39.550 right sided pneumothorax with

NOTE Confidence: 0.9533522

00:05:39.612 --> 00:05:41.200 left sided mediastinal shift

NOTE Confidence: 0.9533522

00:05:41.200 --> 00:05:42.788 highly concerning for tension,

NOTE Confidence: 0.9533522

00:05:42.790 --> 00:05:44.920 Physiology and management of this tension.

NOTE Confidence: 0.9533522

00:05:44.920 --> 00:05:46.344 Pneumothorax was already in

NOTE Confidence: 0.9533522

00:05:46.344 --> 00:05:48.124 progress before at the chest.

NOTE Confidence: 0.9533522

00:05:48.130 --> 00:05:49.905 X Ray was obtained based

NOTE Confidence: 0.9533522

00:05:49.905 --> 00:05:51.325 on the Pokus findings.

NOTE Confidence: 0.9866863

00:05:54.160 --> 00:05:58.102 So what type of shock did this patient have?

NOTE Confidence: 0.9866863

00:05:58.110 --> 00:05:59.738 This was obstructive shock.

NOTE Confidence: 0.9866863

00:05:59.738 --> 00:06:02.611 So let's go through the different types

NOTE Confidence: 0.9866863

00:06:02.611 --> 00:06:04.771 of obstructive shock and what you'd

NOTE Confidence: 0.9866863

00:06:04.771 --> 00:06:07.259 find in each of these categories.

NOTE Confidence: 0.9866863

00:06:07.260 --> 00:06:10.329 So in the heart you might find a pericardial

NOTE Confidence: 0.9866863

00:06:10.329 --> 00:06:12.799 effusion if the causes cardiac tamponade,

NOTE Confidence: 0.9866863

00:06:12.800 --> 00:06:15.208 or you might see right ventricle strain

NOTE Confidence: 0.9866863

00:06:15.208 --> 00:06:17.958 if the cause was a pulmonary embolism,

NOTE Confidence: 0.9866863

00:06:17.960 --> 00:06:20.655 the IVC will look plethoric no matter

NOTE Confidence: 0.9866863

00:06:20.655 --> 00:06:23.056 what the abdomen would be normal and

NOTE Confidence: 0.9866863

00:06:23.056 --> 00:06:25.302 the lungs if it was a pneumothorax

NOTE Confidence: 0.9866863

00:06:25.302 --> 00:06:27.786 would have absent lung sliding on

NOTE Confidence: 0.9866863

00:06:27.786 --> 00:06:30.140 the side of the pneumo thorax.

NOTE Confidence: 0.9860094

00:06:32.610 --> 00:06:35.805 Our next case is a 17 year old woman

NOTE Confidence: 0.9860094

00:06:35.805 --> 00:06:38.289 presenting with severe abdominal pain,

NOTE Confidence: 0.9860094

00:06:38.290 --> 00:06:39.511 emesis and diarrhea.

NOTE Confidence: 0.9860094

00:06:39.511 --> 00:06:41.139 Here are her vitals.

NOTE Confidence: 0.9860094

00:06:41.140 --> 00:06:43.095 She has rebound tenderness to

NOTE Confidence: 0.9860094

00:06:43.095 --> 00:06:45.050 palpation in her lower abdomen

NOTE Confidence: 0.9860094

00:06:45.123 --> 00:06:46.819 and is diffusely guarding.

NOTE Confidence: 0.9860094

00:06:46.820 --> 00:06:49.767 So what are the most pressing diagnosis

NOTE Confidence: 0.9860094

00:06:49.767 --> 00:06:52.909 you would like to rule out with pokus?

NOTE Confidence: 0.980164800000001

00:06:56.420 --> 00:06:59.164 So here we're looking at the right upper

NOTE Confidence: 0.980164800000001

00:06:59.164 --> 00:07:01.268 quadrant using our curvilinear probe in

NOTE Confidence: 0.980164800000001

00:07:01.268 --> 00:07:03.713 a corona plane with the probe marker

NOTE Confidence: 0.980164800000001

00:07:03.713 --> 00:07:05.849 pointed towards the patients head we

NOTE Confidence: 0.980164800000001

00:07:05.849 --> 00:07:08.992 see the liver and the. Kidney here.

NOTE Confidence: 0.980164800000001

00:07:08.992 --> 00:07:12.100 And we're looking in Morrison's pouch,

NOTE Confidence: 0.980164800000001

00:07:12.100 --> 00:07:15.236 and at the tip of the liver liver, no.

NOTE Confidence: 0.980164800000001

00:07:15.236 --> 00:07:17.620 At the inferior tip.

NOTE Confidence: 0.980164800000001

00:07:17.620 --> 00:07:21.202 We are seeing some free fluid

NOTE Confidence: 0.980164800000001

00:07:21.202 --> 00:07:24.270 that black sliver there that.

NOTE Confidence: 0.980164800000001

00:07:24.270 --> 00:07:27.700 Is a very concerning fast.

NOTE Confidence: 0.9815741

00:07:31.280 --> 00:07:33.828 Here are the transverse and sagittal pelvic

NOTE Confidence: 0.9815741

00:07:33.828 --> 00:07:36.479 views in the transverse pelvis view.

NOTE Confidence: 0.9815741

00:07:36.480 --> 00:07:38.934 You see the bladder as a

NOTE Confidence: 0.9815741

00:07:38.934 --> 00:07:40.161 rectangular anechoic structure

NOTE Confidence: 0.9815741

00:07:40.161 --> 00:07:42.480 in the beginning of the clip,

NOTE Confidence: 0.9815741

00:07:42.480 --> 00:07:45.280 and then as we sweep the pelvis,

NOTE Confidence: 0.9815741

00:07:45.280 --> 00:07:47.814 we see all that free fluid coming

NOTE Confidence: 0.9815741

00:07:47.814 --> 00:07:50.480 into view in that sagittal view.

NOTE Confidence: 0.9815741

00:07:50.480 --> 00:07:52.620 The bladder is that circumscribed

NOTE Confidence: 0.9815741

00:07:52.620 --> 00:07:55.192 structure on the right side of

NOTE Confidence: 0.9815741

00:07:55.192 --> 00:07:56.982 the screen and then everything

NOTE Confidence: 0.9815741

00:07:56.982 --> 00:07:59.680 superior to it is black free fluid.

NOTE Confidence: 0.9892382

00:08:01.470 --> 00:08:04.228 So what type of shock was this?

NOTE Confidence: 0.9892382

00:08:04.230 --> 00:08:06.522 This is hypovolemic shock so you

NOTE Confidence: 0.9892382

00:08:06.522 --> 00:08:09.037 can see this in trauma situations

NOTE Confidence: 0.9892382

00:08:09.037 --> 00:08:11.755 in a ruptured ectopic like this

NOTE Confidence: 0.9892382

00:08:11.755 --> 00:08:14.577 one and other examples as well.

NOTE Confidence: 0.9892382

00:08:14.580 --> 00:08:15.720 In hypovolemic shock,

NOTE Confidence: 0.9892382

00:08:15.720 --> 00:08:18.000 the heart will typically look hyperdynamic.

NOTE Confidence: 0.9892382

00:08:18.000 --> 00:08:19.900 The IVC will be collapsed.

NOTE Confidence: 0.9892382

00:08:19.900 --> 00:08:22.678 The abdomen may be positive if

NOTE Confidence: 0.9892382

00:08:22.678 --> 00:08:25.593 this is the source of bleeding

NOTE Confidence: 0.9892382

00:08:25.593 --> 00:08:28.497 and the lungs will be normal.

NOTE Confidence: 0.9892382

00:08:28.500 --> 00:08:31.268 Our next case is a 10 month old

NOTE Confidence: 0.9892382

00:08:31.268 --> 00:08:33.790 boy with emesis and lethargy.

NOTE Confidence: 0.9892382

00:08:33.790 --> 00:08:35.995 He had been seen in an outside

NOTE Confidence: 0.9892382

00:08:35.995 --> 00:08:38.655 hospital the day prior with emesis

NOTE Confidence: 0.9892382

00:08:38.655 --> 00:08:40.299 diagnosed with gastroenteritis.

NOTE Confidence: 0.9892382

00:08:40.300 --> 00:08:42.340 Tolerated PO in Vincent home,

NOTE Confidence: 0.9892382

00:08:42.340 --> 00:08:44.770 then he returned early the next

NOTE Confidence: 0.9892382

00:08:44.770 --> 00:08:46.866 morning with recurrent vomiting and

NOTE Confidence: 0.9892382

00:08:46.866 --> 00:08:49.296 respiratory distress was sent to your

NOTE Confidence: 0.9892382

00:08:49.296 --> 00:08:51.290 hospital with concern for sepsis,

NOTE Confidence: 0.9892382

00:08:51.290 --> 00:08:53.732 an exam this patient is ill

NOTE Confidence: 0.9892382

00:08:53.732 --> 00:08:54.953 appearing minimally responsive,

NOTE Confidence: 0.9892382

00:08:54.960 --> 00:08:56.584 cyanotic with significant abdominal

NOTE Confidence: 0.9892382

00:08:56.584 --> 00:08:58.750 distention. Here are his vitals.

NOTE Confidence: 0.9892382

00:08:58.750 --> 00:09:00.510 His blood pressure 70.

NOTE Confidence: 0.9892382

00:09:00.510 --> 00:09:03.900 / 30 in heart rate 205.

NOTE Confidence: 0.9892382

00:09:03.900 --> 00:09:05.678 How would you like to use pocus

NOTE Confidence: 0.9892382

00:09:05.678 --> 00:09:07.171 in this patient to differentiate

NOTE Confidence: 0.9892382

00:09:07.171 --> 00:09:08.507 the source of shock?

NOTE Confidence: 0.964322828571428

00:09:10.810 --> 00:09:12.846 So in this patient.

NOTE Confidence: 0.964322828571428

00:09:12.846 --> 00:09:15.391 The user started with the

NOTE Confidence: 0.964322828571428

00:09:15.391 --> 00:09:18.059 linear probe on the abdomen.

NOTE Confidence: 0.964322828571428

00:09:18.060 --> 00:09:20.088 Because of that abdominal

NOTE Confidence: 0.964322828571428

00:09:20.088 --> 00:09:22.116 distention on the left,

NOTE Confidence: 0.964322828571428

00:09:22.120 --> 00:09:25.936 you see the classic target sign

NOTE Confidence: 0.964322828571428

00:09:25.936 --> 00:09:27.844 of ileocolic intussusception.

NOTE Confidence: 0.964322828571428

00:09:27.850 --> 00:09:29.956 The whole target sign is greater

NOTE Confidence: 0.964322828571428

00:09:29.956 --> 00:09:31.360 than two centimeters diameter,

NOTE Confidence: 0.964322828571428

00:09:31.360 --> 00:09:33.684 so this is more likely ileo colic

NOTE Confidence: 0.964322828571428

00:09:33.684 --> 00:09:35.964 as opposed to ilio ilio and in

NOTE Confidence: 0.964322828571428

00:09:35.964 --> 00:09:38.264 the center you see a lymph node

NOTE Confidence: 0.964322828571428

00:09:38.264 --> 00:09:41.078 which is a frequent lead point of

NOTE Confidence: 0.964322828571428

00:09:41.078 --> 00:09:43.312 intussusception in kids these age.

NOTE Confidence: 0.964322828571428

00:09:43.312 --> 00:09:46.156 On the right side you see.

NOTE Confidence: 0.964322828571428

00:09:46.160 --> 00:09:50.696 Dilated non peristalsis in loops of bowel.

NOTE Confidence: 0.964322828571428

00:09:50.700 --> 00:09:52.860 This is consistent with sbo

NOTE Confidence: 0.964322828571428

00:09:52.860 --> 00:09:54.156 secondary to intussusception,

NOTE Confidence: 0.964322828571428

00:09:54.160 --> 00:09:56.632 and can also be consistent with

NOTE Confidence: 0.964322828571428

00:09:56.632 --> 00:09:59.360 ileus in this very sick infant.

NOTE Confidence: 0.9667894

00:10:01.720 --> 00:10:04.200 Here are the radiographs which

NOTE Confidence: 0.9667894

00:10:04.200 --> 00:10:06.680 demonstrate dilated small bowel loops

NOTE Confidence: 0.9667894

00:10:06.762 --> 00:10:09.058 with air fluid levels in the left

NOTE Confidence: 0.9667894

00:10:09.058 --> 00:10:11.523 side of the abdomen with a paucity

NOTE Confidence: 0.9667894

00:10:11.523 --> 00:10:13.960 of gas in the small bowel loops

NOTE Confidence: 0.9667894

00:10:13.960 --> 00:10:16.270 on the right side of the abdomen

NOTE Confidence: 0.9667894

00:10:16.270 --> 00:10:18.887 and large bell concerning for high

NOTE Confidence: 0.9667894

00:10:18.887 --> 00:10:20.775 grade small bowel obstruction.

NOTE Confidence: 0.9667894

00:10:20.780 --> 00:10:22.982 This patient was taken emergently to

NOTE Confidence: 0.9667894

00:10:22.982 --> 00:10:25.540 the OR where they resected bowel.

NOTE Confidence: 0.9667894

00:10:25.540 --> 00:10:28.100 Here pokus expedited diagnosis

NOTE Confidence: 0.9667894

00:10:28.100 --> 00:10:30.020 and operative management.

NOTE Confidence: 0.9667894

00:10:30.020 --> 00:10:33.618 So what type of shock was this?

NOTE Confidence: 0.9667894

00:10:33.620 --> 00:10:35.248 This was distributive shock.

NOTE Confidence: 0.9667894

00:10:35.248 --> 00:10:38.740 Some things you might see in a patient

NOTE Confidence: 0.9667894

00:10:38.740 --> 00:10:41.656 with distributive shock might be a

NOTE Confidence: 0.9667894

00:10:41.656 --> 00:10:43.918 perforated appendicitis in the abdomen

NOTE Confidence: 0.9667894

00:10:43.918 --> 00:10:46.348 and intussusception or in the lungs.

NOTE Confidence: 0.9667894

00:10:46.350 --> 00:10:49.338 You might see pneumonia.

NOTE Confidence: 0.9667894

00:10:49.340 --> 00:10:50.116 In general,

NOTE Confidence: 0.9667894

00:10:50.116 --> 00:10:52.444 the heart will be hyperdynamic and

NOTE Confidence: 0.9667894

00:10:52.444 --> 00:10:55.306 the IVC will be normal or collapsed.

NOTE Confidence: 0.97012424

00:10:57.830 --> 00:11:00.140 Here's an illustration of the

NOTE Confidence: 0.97012424

00:11:00.140 --> 00:11:01.490 Rush algorithm suggestion.

NOTE Confidence: 0.97012424

00:11:01.490 --> 00:11:04.500 There are a couple of Numonyx that

NOTE Confidence: 0.97012424

00:11:04.500 --> 00:11:07.384 people use to remember the different

NOTE Confidence: 0.97012424

00:11:07.384 --> 00:11:09.814 components to the Rush protocol,

NOTE Confidence: 0.97012424

00:11:09.820 --> 00:11:12.125 and remember that this was

NOTE Confidence: 0.97012424

00:11:12.125 --> 00:11:13.969 developed in adult patients.

NOTE Confidence: 0.97012424

00:11:13.970 --> 00:11:17.192 So one is the pump, the tank,

NOTE Confidence: 0.97012424

00:11:17.192 --> 00:11:20.419 the pipes, the pump being the heart,

NOTE Confidence: 0.97012424

00:11:20.420 --> 00:11:23.036 the tank being the thorax and

NOTE Confidence: 0.97012424

00:11:23.036 --> 00:11:25.865 abdomen and the pipes being the

NOTE Confidence: 0.97012424

00:11:25.865 --> 00:11:28.365 aorta and IVC another mnemonic.

NOTE Confidence: 0.97012424

00:11:28.370 --> 00:11:32.115 Is high map HIMAP for heart IVC,

NOTE Confidence: 0.97012424

00:11:32.120 --> 00:11:34.049 Morrison's aorta, pulmonary?

NOTE Confidence: 0.97012424

00:11:34.049 --> 00:11:37.264 And then you can also

NOTE Confidence: 0.97012424

00:11:37.264 --> 00:11:40.020 consider adding DVT into that.

NOTE Confidence: 0.97012424

00:11:40.020 --> 00:11:42.360 In pediatric patients in general,

NOTE Confidence: 0.97012424

00:11:42.360 --> 00:11:45.482 we're not that interested in the aorta

NOTE Confidence: 0.97012424

00:11:45.482 --> 00:11:48.890 or DVT unless there are risk factors.

NOTE Confidence: 0.97012424

00:11:48.890 --> 00:11:52.082 But I do encourage you to look

NOTE Confidence: 0.97012424

00:11:52.082 --> 00:11:54.953 for intussusception as part of the

NOTE Confidence: 0.97012424

00:11:54.953 --> 00:11:57.767 abdomen portion of the Rush protocol.

NOTE Confidence: 0.97012424

00:11:57.770 --> 00:12:00.105 Some people have termed this

NOTE Confidence: 0.97012424

00:12:00.105 --> 00:12:02.440 component as the pediatric pipes,

NOTE Confidence: 0.97012424

00:12:02.440 --> 00:12:05.212 so always look for those pediatric

NOTE Confidence: 0.97012424

00:12:05.212 --> 00:12:07.060 pipes being intussusception and

NOTE Confidence: 0.97012424

00:12:07.130 --> 00:12:09.655 some have also advocated for

NOTE Confidence: 0.97012424

00:12:09.655 --> 00:12:11.675 looking for intracranial hemorrhage.

NOTE Confidence: 0.97012424

00:12:11.680 --> 00:12:14.626 In through that with the trans.

NOTE Confidence: 0.97012424

00:12:14.630 --> 00:12:16.590 Fontanelle ultrasound in infants.

NOTE Confidence: 0.96362585

00:12:18.610 --> 00:12:21.274 Let's talk about some of the

NOTE Confidence: 0.96362585

00:12:21.274 --> 00:12:23.860 literature behind the Rush protocol.

NOTE Confidence: 0.96362585

00:12:23.860 --> 00:12:26.320 So this was one prospective

NOTE Confidence: 0.96362585

00:12:26.320 --> 00:12:29.100 observational study in an academic Ed.

NOTE Confidence: 0.96362585

00:12:29.100 --> 00:12:31.510 They used a convenience sample

NOTE Confidence: 0.96362585

00:12:31.510 --> 00:12:33.920 of 118 patients with systolic

NOTE Confidence: 0.96362585

00:12:34.007 --> 00:12:36.257 blood pressure less than 90.

NOTE Confidence: 0.96362585

00:12:36.260 --> 00:12:39.002 After an initial fluid bullets without

NOTE Confidence: 0.96362585

00:12:39.002 --> 00:12:41.510 obvious source of hypo tension,

NOTE Confidence: 0.96362585

00:12:41.510 --> 00:12:44.150 they found a significant decrease

NOTE Confidence: 0.96362585

00:12:44.150 --> 00:12:46.262 in diagnostic uncertainty when

NOTE Confidence: 0.96362585

00:12:46.262 --> 00:12:48.757 Pocus was used and in increase.

NOTE Confidence: 0.96362585

00:12:48.760 --> 00:12:51.304 In the proportion with a definitive

NOTE Confidence: 0.96362585

00:12:51.304 --> 00:12:54.060 diagnosis from .8 to 12.7 percent,

NOTE Confidence: 0.96362585

00:12:54.060 --> 00:12:56.130 25% had a significant change

NOTE Confidence: 0.96362585

00:12:56.130 --> 00:12:58.930 in the use of Ivy fluids,

NOTE Confidence: 0.96362585

00:12:58.930 --> 00:12:59.814 vasoactive agents,

NOTE Confidence: 0.96362585

00:12:59.814 --> 00:13:01.140 or blood products,

NOTE Confidence: 0.96362585

00:13:01.140 --> 00:13:04.185 and 30% had a change in the

NOTE Confidence: 0.96362585

00:13:04.185 --> 00:13:06.000 major diagnostic imaging used.

NOTE Confidence: 0.9904164

00:13:08.760 --> 00:13:10.173 Here's another study.

NOTE Confidence: 0.9904164

00:13:10.173 --> 00:13:12.057 This was a prospective,

NOTE Confidence: 0.9904164

00:13:12.060 --> 00:13:13.776 observational controlled study

NOTE Confidence: 0.9904164

00:13:13.776 --> 00:13:16.636 in an academic hospital floor.

NOTE Confidence: 0.9904164

00:13:16.640 --> 00:13:19.224 It included 165 patients.

NOTE Confidence: 0.9904164

00:13:19.224 --> 00:13:23.100 Including 83 in the focus group

NOTE Confidence: 0.9904164

00:13:23.216 --> 00:13:26.390 and 82 in the control group.

NOTE Confidence: 0.9904164

00:13:26.390 --> 00:13:29.168 They had two hospital floor teams

NOTE Confidence: 0.9904164

00:13:29.168 --> 00:13:31.591 which alternated every other day

NOTE Confidence: 0.9904164

00:13:31.591 --> 00:13:34.056 on patients with acute respiratory

NOTE Confidence: 0.9904164

00:13:34.056 --> 00:13:36.028 and or circulatory failure.

NOTE Confidence: 0.9904164

00:13:36.030 --> 00:13:39.870 Only one of the teams used an ultrasound

NOTE Confidence: 0.9904164

00:13:39.870 --> 00:13:42.779 device that was the focus group,

NOTE Confidence: 0.9904164

00:13:42.780 --> 00:13:45.870 so they found that the proportion

NOTE Confidence: 0.9904164

00:13:45.870 --> 00:13:47.930 of adequate immediate diagnosis

NOTE Confidence: 0.9904164

00:13:48.015 --> 00:13:50.534 was 94% in the focus group.

NOTE Confidence: 0.9904164

00:13:50.534 --> 00:13:53.780 And 80% in the control group that

NOTE Confidence: 0.9904164

00:13:53.780 --> 00:13:55.136 was statistically significant.

NOTE Confidence: 0.9904164

00:13:55.140 --> 00:13:57.400 There was also a statistically

NOTE Confidence: 0.9904164

00:13:57.400 --> 00:13:59.950 significant time difference in the

NOTE Confidence: 0.9904164

00:13:59.950 --> 00:14:03.710 time to 1st treatment or intervention.

NOTE Confidence: 0.9904164

00:14:03.710 --> 00:14:05.934 And it was shorter in the focus group.

NOTE Confidence: 0.9904164

00:14:05.940 --> 00:14:07.620 So 15 minutes in that group,

NOTE Confidence: 0.9904164

00:14:07.620 --> 00:14:10.776 34 minutes in the control group.

NOTE Confidence: 0.9904164

00:14:10.780 --> 00:14:13.066 They found that pokas may improve

NOTE Confidence: 0.9904164

00:14:13.066 --> 00:14:14.590 the proportion of patients

NOTE Confidence: 0.9904164

00:14:14.655 --> 00:14:16.367 with an adequate diagnosis.

NOTE Confidence: 0.9904164

00:14:16.370 --> 00:14:18.360 The time to initial treatment,

NOTE Confidence: 0.9904164

00:14:18.360 --> 00:14:19.560 and perhaps survival.

NOTE Confidence: 0.96406597

00:14:24.070 --> 00:14:26.296 Let's go back to this chart of

NOTE Confidence: 0.96406597

00:14:26.296 --> 00:14:27.889 the different types of shock.

NOTE Confidence: 0.96406597

00:14:27.890 --> 00:14:30.109 Where might you start with your probe?

NOTE Confidence: 0.96406597

00:14:30.110 --> 00:14:32.078 I'll tell you that the first

NOTE Confidence: 0.96406597

00:14:32.078 --> 00:14:34.369 thing that I look like like to

NOTE Confidence: 0.96406597

00:14:34.369 --> 00:14:36.469 look at is the heart and IBC.

NOTE Confidence: 0.96406597

00:14:36.470 --> 00:14:38.870 The heart and IVC can tell you immediately

NOTE Confidence: 0.96406597

00:14:38.870 --> 00:14:41.558 if you need to be judicious with fluids,

NOTE Confidence: 0.96406597

00:14:41.560 --> 00:14:44.024 or if you need to start major fluid

NOTE Confidence: 0.96406597

00:14:44.024 --> 00:14:45.960 resuscitation which is of utmost importance

NOTE Confidence: 0.96406597

00:14:45.960 --> 00:14:48.240 to differentiate in a patient in shock,

NOTE Confidence: 0.96406597

00:14:48.240 --> 00:14:50.221 then you can tailor the rest of

NOTE Confidence: 0.96406597

00:14:50.221 --> 00:14:51.764 your assessment based on your

NOTE Confidence: 0.96406597

00:14:51.764 --> 00:14:53.044 suspicion for different pathologies

NOTE Confidence: 0.96406597

00:14:53.044 --> 00:14:54.970 or do a complete assessment.

NOTE Confidence: 0.96406597

00:14:54.970 --> 00:14:56.614 In the undifferentiated patient,

NOTE Confidence: 0.96406597

00:14:56.614 --> 00:14:59.441 use a mnemonic of your choosing and

NOTE Confidence: 0.96406597

00:14:59.441 --> 00:15:01.520 go out there and save some lives.

NOTE Confidence: 0.96406597

00:15:01.520 --> 00:15:02.956 Thank you so much.

NOTE Confidence: 0.96406597

00:15:02.956 --> 00:15:06.010 I would love to hear your questions,

NOTE Confidence: 0.96406597

00:15:06.010 --> 00:15:07.231 comments and stories.

NOTE Confidence: 0.96406597

00:15:07.231 --> 00:15:09.673 You can email me at julieleviter@yale.edu.

NOTE Confidence: 0.96406597

00:15:09.680 --> 00:15:11.219 Thank you again.