FOCUS OUTCOMES AND SAFETY: A 'NON-COCHRANY' LITERATURE REVIEW

by Justin Bowra and Alan Giles

NOW THE PAPERS IN GORY DETAIL

US scan / application	Paper, outcomes studied.	Good or bad?	Notes
for adult abdominal (BAT)	Stengel et al. Cochrane RV 2015. Studied death rates and use of MDCT [multidetector CT] … plus Melniker's rebuttal (Melniker L. Cochrane Rebuttal Crit US J 2009)	**JB: Stengel's Cochrane Review can't say if FAST is any good!** Not enough evidence either way. Few RCTs, poor methodology, and FAST is demonstrated to have low sens/spec… so while FAST undoubtedly reduced use of MDCT, this might not be a good thing! But **Melniker's rebuttal** [also a systematic RV, of 2755 patients] contends that they asked the wrong question, and FAST was 'a near-perfect tool for predicting a need for OR in BAT'	*Stengel: 'It can only be concluded f... the few head-to-head studies that negative US scans are likely to red... the incidence of MDCT scans which given the low sensitivity of FAST (o... reliability of negative results), may adversely affect the diagnostic yiel... the trauma survey. At best, US has... negative impact on mortality or morbidity.'* *Melniker: 2755 patients with BAT, 4... went to OT on the basis of FAST, 5... false-negative FAST*
for adult trauma.	Melniker et al. SOAP-1. Annals EM 2006. ABSTRACT ONLY. *The primary objective is to assess whether [FAST] … with suspected torso trauma decreased time to operative care. Other outcomes measured included:*	**JB: good!** Addition of FAST led to: Decreased time to operative care (64% less) Fewer CTs (odds ratio 0.16) (0.07, 0.32), Fewer days in hospital (27% less (1, 46)) Fewer complications (odds ratio 0.16) (0.07, 0.32) Fewer charges (NB USA study) (35% less (19, 48))	Small study [n=262]. Single centre.
for	Calder B et al.	**JB: bad in the wrong hands, and in the wrong**	*FAST as currently used had lim...*

ric BAT	Studied accuracy for detecting intra-abdo injury, use of MDCT [multidetector CT], and OT rate.	**group, and for the wrong reasons!** My gut feeling says the drs don't understand the role of FAST. [a] The drs performed FAST in the wrong group: 97% patients receiving FAST had stable vitals and 64% a normal abdo exam! [b] the authors noted that FAST was insensitive in picking up solid organ / GI / mesenteric injury! ...suggests that the centres involved may not have understood FAST limitations either. Furthermore, just a data review, and no idea of level of training of drs. In fact i'd conclude '[a] In the hands of drs who don't understand the role of FAST, it is not helpful'... and '[b] FAST for BAT is only helpful in hypotensive patients with a clinical suspicion of BAT eg abnormal abdo exam'!	*sensitivity to screen for IAI in children sustaining BAT and wh performed rarely changed management.*
or ric BAT	Holmes et al. RCT FAST paed BAT. JAMA. 2017 *OBJECTIVE: To determine if the FAST examination during initial evaluation of injured children improves clinical care.*	**JB: useless in the wrong group of patients (stable BAT):** 975 patients <18 years old, all stable, no difference in OT rate, length of stay, hospital resources, etc. Well, duh!	In subsequent corresponden published in JAMA, the autho themselves conceded that *'th FAST examination has a role the evaluation of specific subgroups of injured children (hypotensive) and may decre CT use in low-risk injured children.'*
for atic shock	Sasmaz Effect of Focused Bedside Ultrasonography in Hypotensive Patients 2017. Studied diagnostic accuracy.	**JB: good:** accuracy went up from 60% to 80% with RUSH… but actual patient outcome not studied	Interesting! Esp bc they state POCUS changed Mx plan in of cases. Unfortunately didn't assess patient outcome! Sma [n=180], retrospective, single centre, probably unblinded, fi Dx composite decision by 3 'other drs'

or atic shock similar to out doesn't ate lung s much)	Atkinson P et al. SHoC-ED1 Annals EM 2018. *The primary outcome measure was survival to 30 days or hospital discharge.*	**JB: bad!** *We did not find any benefits for survival, length of stay, rates of CT scanning, inotrope use, or fluid administration.* Possible explanations: [a] POCUS doesn't help; [b] inadequate training; [c] didn't look for anterior pneumothorax, interstitial syndrome, or consolidation; [d] Crager and Hoffman contend that *'the study was substantially underpowered, with a sample size intended to detect an extremely ambitious 10% reduction in mortality. It is hard to identify any single intervention that has this much influence on mortality in acutely ill patients; to put this in perspective, the absolute risk reduction in mortality conferred by aspirin in acute myocardial infarction is something on the order of approximately 3%.* [Crager and Hoffman editorial. But it makes sense physiologically. Annals EM 2018 .pdf]	Small study [n=173] but good methodology: multicentre RC inclusion SBP<100 or shock index >1. It looks like they di look for B-lines though?
ardiac in d patients: **nance**	Two papers here: [a] Reed MJ et al. Introduction of paramedic led Echo in Life Support into the pre-hospital environment: the PUCA study. Resuscitation. 2017;112:65-69. [b] Huis In 't Veld MA et al. Ultrasound use during cardiopulmonary resuscitation is associated with	**JB: bad!** Reed MJ et al showed that paramedic-performed echo in ALS prolongs the median time off chest to 17 sec (range 13-20). Veld study showed mean duration of pulse checks with POCUS was 21.0 s (95% CI, 18–24) compared with 13.0 s (95% CI, 12–15) for those without POCUS.	

	delays in chest compressions. Resuscitation. 2017 Oct;119:95-98.		
ardiac ; in d patients: etation	Hu Andrus Nelson POCUS arrest 2017. *The goal of this study is to assess the variability in interpretation of standstill among physician sonographers.*	**JB: bad!** *Lack of agreement across specialties, self-reported training levels, and self-reported ultrasonographic expertise.* (Not strictly speaking 'outcomes', but you can see this could lead to BAD outcomes because team leader calls the arrest but patient still has cardiac activity)	Good mix of participants = 12 (faculty, fellows, and trainees ED, ICU, cardiology. At 3 different academic centres in 15 clips, 20 secs.
ardiac ; in d patients: es	**Two papers here:** [1] Salen Melniker et al SOAP-2 Trial - Cardiac Arrest [2] Gaspari R et al. ED POCUS point-of-care ultrasound in out-of-hospital and in-ED cardiac arrest. Resuscitation 2016. *Real time assessment and sonographic outcomes network* Aim: to determine whether cardiac activity on ultrasound during ACLS is associated with i**mproved survival to discharge from hospital.**	**JB: good! [Finally!]** Salen and Melniker found that cardiac activity was assoc with ROSC, but small numbers [1 survivor to DC with good neurol outcome, this one was in the PEA group]. Gaspari's REASON paper proposed a sensible definition of standstill… and road-tested it in a sensible fashion … and came up with some solid data to suggest that we are correct, the presence of cardiac activity on POCUS has 4% survival to hospital DC… and importantly, it is probably OK to cease CPR efforts if you see cardiac standstill. (As long as you know what you're seeing!) **(We still don't have figures on survival to DC with good neurological outcome)**	Gaspari paper: ● Methods: non-randomized, prospect protocol-driven observational study a hospitals across Unite States and Canada. Excluded VF/VT, and excluded traumatic arrests; also excluded Resuscitation not continued after initial ultrasound [to avoid POCUS standstill dro the decision to cease CPR] / Resuscitation efforts discontinued d to a DNR order/ Resuscitation lasted < minutes ● 793 patients enrolled

			- asystole or PEA; only (1.6%) survived to hospital DC - Cardiac activity on US 3.8% survived to DC patients) - Tamponade with pericardiocentesis: highest survival to DC 15.4% (still only 2 patients) - PE with thrombolysis: 6.7% (just one patient - No cardiac activity on 0.6% (3 patients out o 530, but Andrus [corresponding autho Hu Andrus Nelson pap contends that one of Gaspari's 3 survivors DC with 'no activity during arrest' actually cardiac activity when reviewed the loop...
S in ting injury: **nes**	Plummer D et al. ED echo penetrating cardiac injury 1992 Annals EM.pdf	**JB: good!** [a] Survival was 100% in the echo group and 57.1% in the nonecho group. [b] Average time to diagnosis and disposition for surgical intervention was 15.5+11.4 minutes for the echo group and 42.4 +21.7 minutes for the nonecho group	- Retrospective chart review 49 Ps only - Single centre
S in ory	Laursen CB et al. POCUS in patients	**JB: good news and bad news (maybe!)** [a] The primary endpoint was the percentage of	Pretty heterogenous group! Not just 'resp

tations: [a] cy and [b] es	admitted with respiratory symptoms: a single--blind RCT. Lancet Respir Med. 2014. Study question: does the addition of lung POCUS improve diagnostic accuracy of the ED workup?	patients with a correct presumptive diagnosis 4 h after admission to the emergency department… and they proved their case: 139 Ps (88%) with POCUS, versus 100 Ps (64%) without POCUS, had correct Dx at 4h. [b] But there was a non-significant trend to worse outcomes in the POCUS group! In-hospital and 30-day mortality trended towards harm in the POCUS arm (8.2% vs 5.1% and 12% vs 7% respectively). [c] Nor was there any meaningful difference in length of stay or hospital-free days between those in the POCUS group and those in the control group. [d] significant increase in downstream testing in the POCUS group: chest CTs (8.2% vs 1.9%), echocardiograms (10.1% vs 3.8%) and diagnostic thoracentesis (5.7% vs 0%). "these findings are concerning for a certain degree of overdiagnosis." [Spiegel R editorial, *'ED Hocus POCUS ... or Just a Hoax?'* - https://www.emlitofnote.com/?p=298]	distress' but RR>20/n O2 sats<95%, O2 therapy, dyspnoea, cough, or chest pain ● Small study n = 315 ● Good methodology
S in ric onia	Jones BP, Tay ET, Elikashvili I, et al. Feasibility and safety of substituting lung ultrasound for chest x-ray when diagnosing pneumonia in children: a randomized controlled trial. Chest 2016;150:131-8.	**Juz: good and bad [maybe]!** [a] Use of LUS [lung US] PoCUS reduced the use of chest X-rays in pediatric patients with suspected pneumonia. [b] However, there was a (non-significant) increase in the number of patients diagnosed with pneumonia and treated with antibiotics with **no difference in clinical outcomes. (Non-significant so it's hard to say what this means…)**	n=191