

MÁ POCUS VYUŽITÍ V PŘEDNEMOCNIČNÍ NEODKLADNÉ PÉČI?

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„As we look to the proliferation of USG instruments into the hands of untrained physicians, we can only come to the unfortunate realization that diagnostic sonography truly is the next stethoscope: used by many, understood by few “

Editorial

Roy A. Filly, MD

Ultrasound: The Stethoscope of the Future, Alas¹

IF I've heard it once, I've heard it a hundred times. I've heard it from critics and admirers, from radiologists and nonradiologists, from individuals I respect and from those I do not respect. And what they say is: "Ultrasound [sonography] is the stethoscope of the future." Unfortunately, this prediction is likely to be true.

Although the stethoscope is one of the most widely employed diagnostic instruments, it is also one of the most poorly used. When I was a medical student, I was profoundly impressed with what could be diagnosed with this simple tool. A professor of cardiology who was one of my teachers—who, incidentally, was somewhat hearing impaired—would, as is customary, examine the patients on service after everyone else had had his or her chance. He would then elaborate on his findings to both our delight and our consternation. We had all used a similar instrument on the identical patient, but the difference in benefit to the patient from his examination compared with ours could not be measured.

Index terms: Editorials • Ultrasound (US), utilization

Radiology 1988; 167:400

¹ From the Department of Radiology, University of California, San Francisco, San Francisco, CA 94143. Received December 22, 1987; accepted December 23. Address reprint requests to the author.

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As I walk about the hospital, I see stethoscopes jauntily draped over the shoulders or hung around the necks of just about everyone: nurses, therapists, medical students, interns, etc. This instrument has become more a badge of dignity than a diagnostic tool. I'm sure the patients don't know that the bulk of these medical artisans haven't an inkling as to the power of the tool they so casually display.

There probably are some physicians around who still realize what can be diagnosed with a stethoscope, but I would guess that they are few, and they must be dismayed at what they see around them. I can only presume that they would feel sorry for my children—the only humans on whom I still employ my auscultatory skills.

At least, every physician is trained to use a stethoscope. However, ultrasound (US) instruments are being purchased increasingly by physicians who have no training at all in diagnostic sonography. I don't have to convince the readers of *Radiology* that diagnostic imaging technologies of all types require highly trained professionals both for performance and for interpretation.

Sonography may be the most difficult imaging technology to master. Having observed many individuals making a concentrated effort to learn this technique in sophisticated training environments and the difficulties they have had, I am astounded that a completely untrained individual would attempt US diagnosis. I can presume only that ignorance is bliss.

If sonography is the stethoscope of the future, so be it. But shouldn't an effort be made to integrate this technology more appropriately into the general practice of medicine? Having a medical license and the price of a machine are not the criteria that should be applied to the use of this diagnostic modality (especially when the price of the machine can be quickly amortized to the financial benefit of the unqualified practitioner and to the financial detriment of medicine in general and the patient in particular).

We are facing a problem that has been ignored for too long. The general unwillingness to face this issue in the past will likely necessitate more drastic and less desirable solutions in the future. Training requirements may have to be mandated or third-party reimbursement curtailed. Either solution will generate a bureaucratic mess with which few will want to contend.

As we look at the proliferation of US instruments into the hands of untrained physicians, we can only come to the unfortunate realization that diagnostic sonography truly is the next stethoscope: used by many, understood by few. ■

BARIÉRY IMPLEMENTACE

RESEARCH ARTICLE

Open Access

Use of prehospital ultrasound in North America: a survey of emergency medical services medical directors

John Taylor^{1,2*}, Kyle McLaughlin³, Andrew McRae³, Eddy Lang³ *a*



Table 2 The barriers EMS Medical directors perceive to implementing prehospital ultrasound n = 198

	Number of respondents	Percentage (95% CI)
Equipment cost	177	89.4% (85.7-93.1)
Training costs	146	73.7% (68.4-79)
Challenges in training	106	53.5% (47.5-59.5)
Transport times	95	48% (42-54)
Concerns about delaying time to definitive care	90	45.5% (39.5-51.5)
Ultrasound is beyond the scope of practice of providers	76	38.4% (32.6-44.2)
Lack of evidence	76	38.4% (32.6-44.2)
Approval by EMS administration	25	12.6% (8.6-16.6)
Buy-in by other EMS medical directors	21	10.6% (6.9-14.3)
Regulatory factors	29	14.6% (10.4-18.8)

POCUS V PNP

- **diagnostické a procedurální indikace prospěšné v PNP**
- **vliv POCUS v PNP na další postup a prognózu**
- **získání kompetence pro POCUS v PNP**

INDIKACE

■ primární vyšetření pacienta

■ hypotenze, šok

■ bolest na hrudi

■ bolesti břicha

■ dušnost

■ kolaps

■ úraz H/B

■ náhlá zástava oběhu

■ infekce, sepse

■ kraniotrauma

■ procedurální indikace

■ kanylace PVC

■ koniotomie

■ nervový blok

■ dekomprese hrudníku

■ intubace

■ perikardiocentéza

■ kanylace ECMO/REBOA

■ ...kdykoliv to považujeme za prospěšné

CO POMÁHÁ ROZPOZNAT

- **kardiální plicní edém**
- **odlišení srdečního selhání a CHOPN**
- **dif. dg typu šoku**
- **4H/4T u NZO, rozhodnutí o ukončení KPR**
- **srdeční tamponáda**
- **plicní embolie**
- **hypovolemie**

- **akutní aortální syndrom**
- **pneumotorax, pneumonie, atelektáza, IPP**
- **hluboká žilní trombóza**
- **fraktury dlouhých kostí, sterna, žeber**
- **nitrolební hypertenze**
- **cholecystitida, obstrukční uropatie, pneumoperitoneum, hemoperitoneum**
- **vitalita plodu**

VLIV NA DALŠÍ POSTUP A PROGNÓZU

■ validita POCUS vyšetření v jednotlivých situacích

- zkušenost
- typ přístroje
- prostředí
- kvalita dalšího klinického vyšetření

■ pragmatický efekt na léčbu

- upřesnění diagnózy
- vliv na bezprostřední terapii
- vliv na směřování transportu

■ vliv na prognózu

- mortalita
- morbidita
- nežádoucí účinky léčby
- HRQoL

VLIV NA DALŠÍ POSTUP A PROGNOZU

- **paradox POCUS v PNP**

VALIDITA POCUS V PNP

■ **senzitivita: 50 – 100 %**

■ **specifita: 70 – 100 %**

■ **trauma < netraumatické indikace**

VLIV NA DALŠÍ POSTUP A PROGNÓZU

European Journal of

**Emergency
Medicine**

Prehospital chest emergency sonography trial in Germany: a prospective study

European Journal of Emergency Medicine:
June 2012 - Volume 19 - Issue 3 - p 161-166

Nesse, Albrecht; Jerrentrup, Andreas; Hoffmann, Saskia; Sattler, Alexander; Görg, Christian; Kill, Clemens; Mathias Gress, Thomas; Kunsch, Steffen

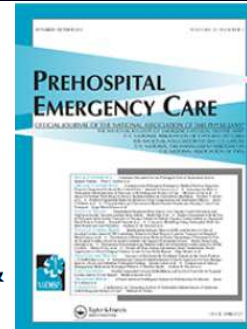
■ 62 nemocných s akutní dušností v PNP

Results: Prehospital chest emergency sonography trial was completed in 56 patients. Mean examination time was 2 min, and no scan took longer than 5 min. Sonography was easily integrated in the prehospital workflow alongside paramedic treatment without delay of treatment or transport. The most common diagnoses associated with acute dyspnea were (a) acute coronary syndrome ($n=12$, 21%), (b) decompensated congestive heart failure (CHF) ($n=11$, 20%), and (c) chronic obstructive pulmonary disease (COPD) ($n=10$, 18%). Pleural effusion was detected in 100% of CHF, 17% of acute coronary syndrome, and 20% of COPD patients, constituting a highly significant parameter in the differential diagnosis ($P<0.01$). Ultrasonography provided a helpful tool in $n=38$ (68%), and additional therapeutic consequences were drawn in $n=14$ (25%).

VLIV NA DALŠÍ POSTUP A PROGNÓZU

Prehospital Echocardiography During Resuscitation Impacts Treatment in a Physician-Staffed Helicopter Emergency Medical Service: an Observational Study

Rein Ketelaars, Christian Beekers, Geert-Jan Van Geffen, Gert Jan Scheffer & Nico Hoogerwerf



■ 56 pacientů s OHCA, 102 vyšetření

Change in decision	N (%) US examinations	N (%) Patients
Terminate resuscitation	33 (32)	32 (57)
More intravenous fluid administration	11 (11)	7 (13)
Less intravenous fluid administration	1 (1)	1 (2)
Adjust adrenaline dosage	4 (4)	4 (7)
Start dobutamine (inotropic drugs)	2 (2)	2 (4)
Start phenylephrine (vasopressors)	0	0
Administer heparine	2 (2)	2 (4)
Pericardiocentesis	0	0
Thoracostomy	4 (4)	4 (7)
Insert gastric tube	3 (3)	3 (5)
Transport to different hospital	3 (3)	3 (5)
Provide ED with additional information	4 (4)	4 (7)
Other*	11 (11)	10 (18)
Continue resuscitation†	29 (28)	21 (38)

VLIV NA DALŠÍ POSTUP A PROGNOZU

- 500 nemocných ošetřených v PNP, NACA ≥ 3
- USG hrudníku přístrojem Vscan (GE HealthCare)

SLEDOVANÝ UKAZATEL	%
Upřesnění diagnózy	73,2 %
Úprava terapie	18,6 %
Ovlivnění transportu	28,6 %

- úplná nevyšetřitelnost pro nevhodné prostředí ... **0 %**
- úplná nevyšetřitelnost z důvodu pacient/přístroj ... **3 %**

VLIV NA DALŠÍ POSTUP A PROGNÓZU

■ 30 konsekutivních nemocných s OHCA, TRACE

■ správné určení příčiny OHCA během ALS	96,7%
■ specifická léčba na základě TRACE	30%
■ ROSC	30%
■ CPC 1/2	20%

■ specifická terapie u 30%

VLIV NA PROGNÓZU

- prognostické rozhodování během KPR ve vztahu k ukončení/neukončení KPR*
- jinak žádná data

So WHAT?

KOMPETENCE PRO POCUS V PNP

■ získání

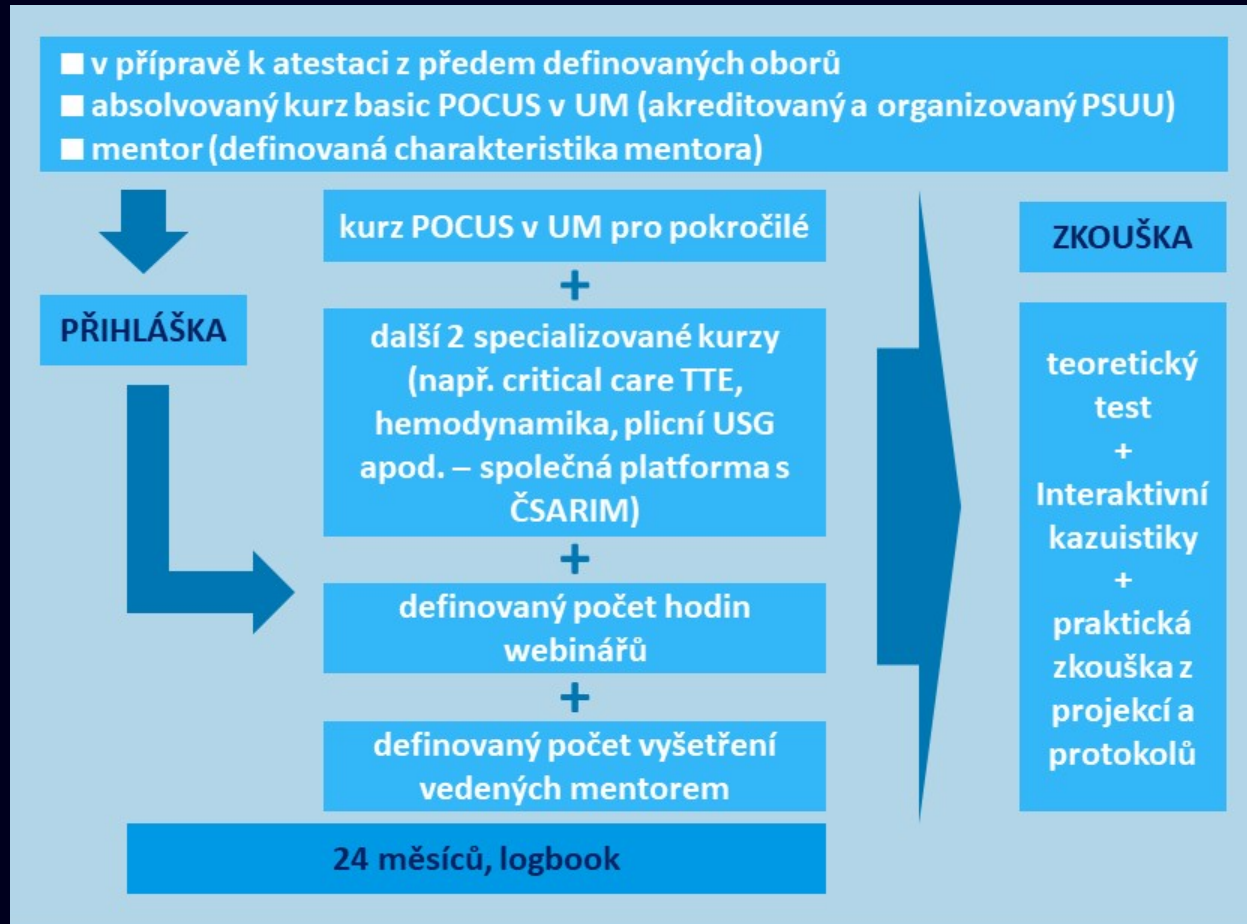
■ udržení

KOMPETENCE PRO POCUS V PNP

- **teoretická výuka interpretace + praktický nácvik**
- **simulační výuka vs. tradiční nácvik**
- **50 vyšetření přináší akceptovatelnou zručnost**

CERTIFIKACE KOMPETENCE V ČR

■ výukový program k získání certifikátu na 1-2 roky



POCUS PRO NLZP

- **ve světě běžné**
- **velký prostor pro využití přístrojů**

BUDOUCNOST

- **vývoj lepších přístrojů, automatické analýzy, strojové učení, kvantifikace**
- **optimalizace rozhodovacího procesu a léčebných protokolů s využitím POCUS**
- **terapeutický USG**
 - **potenciace systémové trombolýzy**
 - **potenciace zástavy krvácení**
 - **USG-guided CPR**

ZÁVĚRY

- POCUS má své uplatnění v PNP
- správná implementace POCUS mění a zlepšuje PNP
- určitě ale není nezbytnou součástí
- pro lékaře i NLZP
- PSUU vyvíjí aktivitu k certifikaci kompetence



Děkuji za pozornost

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