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Research Article

ICU handover procedure: the Greek perspective

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ABSTRACT

Background: Passing the right information poses a challenge in clinical practice. This is the first study in Greece that tries to describe the handover procedure in an intensive care unit to a tertiary hospital.
Methods: A two phase study was conducted during a 155 days period. It included a blind and open observational study which examined the quality and content of clinical handover by night shift doctor to the medical team and a survey about the process. Retrospective cross-checking of the information handed over with one written down in the actual patient record was also conducted.
Results: A total of 800 set of patients' daily records were examined. A structure of system-based approach of the handover was recorded, with system coverage varying from 21% (nutrition) to 86% (respiratory system) and good relation with the actual record in most areas of interest. Other areas, such as comorbidities, and relatives' issue were poorly covered. Education meeting that was held between the two phases did ameliorate the content and the quality of information passed over, and in some areas, proved to have a positive effect on certain aspect of handover like e.g. frequency of interruptions, infection status, relatives' issues and proposed management plan coverage.
Conclusions: Handover process is vital for maintaining stability and quality of care in intensive care unit. Its continual efficiency reevaluation is at least as important as the handover itself for preserving it as a valuable tool in everyday practice.

Keywords: Intensive Care Unit, Clinical handover

INTRODUCTION

Accidents, incidents, and errors are related to shift handovers in many high-risk domains. Among the accidents is the 1988 Piper Alpha Disaster, an off-shore oil platform in the North Sea which exploded and then burned, causing 167 deaths. In 1991 in the US, Continental Express Flight 2574 crashed in a cornfield outside Eagle Lake, Texas, killing all 14 people on board. In both cases, miscommunications during shift handover were causal factors. Because of the increased rates of accidents and errors historically associated with shift handovers, Mars Exploration Rover Mission management paid close attention to shift handovers and, when possible, developed them in accordance with best handover practices.[1]

Clinical handover defined as a process of transferring authority and responsibility for providing care of patients from departing care giver to named recipient, is a basic part of clinical practice. Shift changeover typically includes 1) a period of preparation by outgoing personnel, 2) shift handover, where outgoing and incoming personnel communicate to exchange task-relevant information and 3) cross-checking of information by incoming personnel as they assume responsibility for the task.[2] The goal of shift handover is the accurate, reliable communication of task-relevant information across shift changes, thereby ensuring continuity of safe and effective working. Handover omission endangers patient safety. Failure, for example, to search for specific laboratory or imaging results taken

in the previous day may lead to unnecessary waste of precious time, effort, means and a wrong therapeutic strategy that could accelerate the course to disaster. The case of 78-year old Peter Limbunya in 2009 in Australia is a real example.[3]

Many initiatives have been launched worldwide during the last years in order to solve the problem. "Safe handover: safe patient" of National Agency for Patient Safety of British Medical Association,[4] which later had been adopted by Australian Medical Association,[5] "Acute care handover toolkit 1" of the Royal College of Physician,[6] Clinical handover in the Standards for clinical practice guide of the Royal Australian College of General Practitioners,[7] "Guidance on Clinical handover in the Emergency Department" of the Australasian College for Emergency Medicine[8] and "Safer Sign Off form" of the American College of Emergency Physicians[9] are only some examples of these efforts.

In Greece, there are no guidelines of any kind in this area; neither are there previous published studies on the matter. This study is trying to fill the gap of knowledge about the process of clinical handover by examining the process in an intensive care unit (ICU) of a tertiary hospital. Its objective is to describe the handover procedure, to identify any drawbacks and try to correct them; and to create useful database which can be further used for forming local and national guidelines. Providing information about the process and safety of handoffs between physicians in ICU from countries with different health systems (in this case, the Greek national health system) will also help constructing a research agenda to provide a roadmap to future work in this area.

METHODS

A two stage study was planned and carried out in a 10 bed mixed ICU of a tertiary hospital. Phase I included a blind prospective observational study undertaken over a 22 day period (November 2011), which examined the quality and content of clinical handover by night shift doctor to the medical team. As no national or local guidelines existed about the matter, a specially designed record form was created for the study Key aspects included patient details (demographics and medical history), reason for admission, working diagnosis, system - treatment domains, significant (that cause change in therapeutic plan) changes of the clinical status of the patient during the day, interventions, proposed management plan, laboratory findings and communication with relatives. Additional data collected also included duration of handover, personnel present and frequency of interruptions. A section about calls for patients' evaluation outside ICU was also included (Appendix 1). In order to assure blindness, only two observers and the head of the department knew about the study. Furthermore, the study took place in randomly assigned days determined by an outside supervisor who informed the two observers the day before. The handover was held always once daily at 8 00 am in a dedicated room by one of the two "night" shift (lasting from 15.00 the previous day till the end of the handover the next one) doctors. The attendance included the medical staff of the unit (5 consultants, 5 intensive care trainees, 2 anesthesiology and/or 1 internal medicine residents depending on their training schedule) the head of the department and the head of the nursing staff. The clinical pharmacologist, the physiotherapist, the clinical nutritionist and the administrative secretary were not present during the handover. During weekends, the attendance included only the two incoming doctors and the head of the morning nursing shift (every one lasts 8h). Otherwise, it remained the same. Recording was conducted at the same time by 2 observers so as to avoid any loss of information. After the end of each handover, a retrospective cross check was performed with the actual patient record in order to detect any missed information. Possible clinical outcome defined as unnecessary orders for laboratory or imaging exams, for interventions (e.g. tracheostomy), change of drug regiment were also measured. Due to ethical reasons, no such order was eventually followed, as the observers discreetly alerted in time attending physicians (in case she/he had not had noticed) about the missed information.

After end of phase I, an education meeting about handover was held in two consecutive days. The meeting included presentation of phase I results to the medical team and ways to improve handover procedure. They were also informed that the study was to be continued.

Two days later, phase II began (open phase). The medical team knew that the study was going on, but did not know on which day. The two study observers were always present in the room. Records of 62 clinical handovers held over a 132 day period (January to May 2012) were included.

Finally, a survey among medical team about clinical handover was conducted. The questionnaire included both multiple choice and free response questions. Items examined were satisfaction from the handover procedure, reasons for missed information and experience working in ICU environment.

Data were analyzed descriptively using SPSS Version 19. Comparison between phase I and II (a=0.5, level of significance p = 0.05) were conducted. Subsequently, the results were tabulated and depicted graphically using MS Office Excel 2007. Data analysis was conducted by T.A. and the results were reviewed by M.G-P and I.C.

RESULTS

A total of 800 sets of patients' information records were examined: 207 in phase I and 593 in phase II. Clinical information handed over verbally covered reason for admission (in 12% of cases in phase I versus 16% of cases in phase II), working diagnosis (13% in phase I, 15% in phase II) and current management plan (29%

versus 37% in phase II; but 100% in the latter tree parameters in all new admissions). Medical co morbidities where covered in 8% of phase I cases and in 13% of phase II cases.

Appendix 1: The form used for recording information during handover.

ICU Handover Date:										
Observer:										
Patient No	1	2	3	4	5	6	7	8	9	10
Reason of admission										
Working Diagnosis										
Current management plan										
CNS (sedation/analgesia)										
Hemodynamics										
Respiratory system										
Fluid balance/kidney function										
Other systems (limbs-dermis)										
Nutrition-GI										
Infection status										
Lab findings										
Relatives issues										
Significant clinical changes on 1st shift										
Significant clinical changes on 2nd shift										
Significant clinical changes on 3rd shift										
Proposed management plan										
Interventions										
Duration (total)										
Start (on time/delayed)										
End										
Interruptions										
Time per patient (min)										
Calls outside ICU										

The coverage of certain domains is displayed in table 1. Successful coverage was defined as handover of all information concerning the status of the domain of interest (central nervous system including information

about sedation and analgesia, cardiovascular status – hemodynamics plus any cardiovascular drug regime, etc). Aspects like coverage of significant changes (i.e. changes in clinical status of the patient that requires modification of therapy plan) in the last shift, referral to the intervention that had taken place, recommendations for the forthcoming day, notification of the calls for evaluation of patients outside ICU and comment to relatives' issues is displayed in table 2. Duration and number of interruptions in also shown (table 2). The first varied from 15 to 65 min in both phases and the second was mainly caused by phone calls and requests from visiting teams and nurses.

Table 1: Main aspects coverage (in %) in phase I and phase II.

Successful coverage of different aspects during handover			
Domain covered	**Phase I**	**Phase II**	**p (a=0.05)**
Central nervous system (sedation/ analgesia)	56,04	68,80	<0.001
Cardiovascular-Hemodynamics	54,11	69,81	<0.001
Respiratory system-Mechanical ventilation	85,51	87,69	≈0.05
Fluid balance-Urogenital	68,12	64,25	N/S
Other (extremities-dermis)	25,60	23,95	N/S
Nutrition	20,29	15,18	N/S
Infection status	65,70	63,07	≈0.05

Retrospective analysis with actual patient record was made in order to identify the reason for information missed during handover. While in case of central nervous system status, hemodynamics, respiratory system and fluid balance the lack of information during handover proved to imply stability, this was not the case for infectious status handover where there were identified 15 cases in phase I (7.2%) and 23 cases (3.8%) in phase II were information were missed. The same but in a minor degree applied for fluid balance. Clinical outcome of missed information, defined as unnecessary orders for laboratory of imaging examinations as well as unneeded orders for change of therapy was also recorded (table 3). The lack of information concerning nutrition-GI status did not correlate well with stability status ($r^2 = 0.54$) in Phase I. The latter brought to light a problem of information transferred in this specific section which was ameliorated ($r^2 = 0.77$) in Phase II.

Relatives' issues were mentioned in handover only in cases of communication problems with members of patient's family. Finally, missed information about calls for consultation outside ICU in phase I implied no calls (in 90% of audit days), while in phase II information about the topic is passed to the rest of the team regardless of the actual calls made (in 60% of audit days there have been actually a call) during the previous day.

Table 2: Secondary aspects coverage (in %) in phase I and phase II.

Successful coverage of different aspects during handover II			
Domain covered	**Phase I (22 days)**	**Phase II (62 days)**	**P (a=0.05)**
Significant changes of clinical status in the last shift	26%	35%	<0.001
Interventions	24%	22%	≈0.05
Recommendations for the forthcoming day	32%	44%	<0.001
Calls outside ICU	4.8%	15%	<0.001
Relatives' issues	41%	63%	<0.001
Duration	28	36	<0.001
Duration during weekends	22	32	<0.001
Monday meeting duration	45	45	<0.001
Mean time spent per patient	3.1±1.2 min	4.2±2.2 min	<0.001
Interruptions	34	66	<0.001

The results of survey conducted after the first two phases is displayed in table 4. Half of the responders suggested 60 min as the optimal duration for the clinical handover carried out once a day, while other suggested two rounds of 30 min (at 8.00 in the morning and 14.00 or 15.00 in the afternoon) as an alternative. There was unanimity about the necessity for the presence of nursing team representative during handover. The main problems spotted were frequent interruptions, disagreements among the team, the lack of a unified way of reporting, missing important information and the frequent absence of mentioning a plan for the forthcoming day. Lastly, fatigue and lack of time were mentioned by the responders as the main reason for missing information during handover.

Table 3: Coverage of main domains of handover in absolute numbers with the number of cases with missed information and the clinical outcome of the latter defined either as unneeded orders for extra examinations (Exams) or for therapy changes (Th.ch.).

Missed information and clinical outcome after cross-checking with actual patient record						
Section	**Phase I (n=207)**	**Missed information (total)**	**Clinical outcome**	**Phase II (n=593)**	**Missed information (total)**	**Clinical outcome**
Central nervous system (sedation/analgesia)$^{N/S}$	116	0	0	408	1	1 Th.ch.
Cardiovascular-Hemodynamics$^{N/S}$	112	0	0	414	1	1 Th.ch
Respiratory system-Mechanical ventilation*	177	4	2 Th.ch.	520	1	1 Th.ch.
Fluid balance-Urogenital*	141	8	3 Exams 5 Th.ch.	381	16	7 Exams 11 Th.ch.
Other (extremities-dermis)*	53	4	2 Exams	142	3	3 Exams
Nutrition*	42	4	2 Th.ch.	90	4	2 Th.ch.
Infection status*	136	18	10 Exams 5 Th.ch	374	23	13 Exams 10 Th.ch.

*: Statistically significant difference between two phases. $^{N/S}$: Not Significant difference

Table 4: Survey results.

Primary specialty	
Anesthesiology	7
Internal medicine	2
General surgery	1
ICU Experience	
<2 years	4
2-3 years	1
4-5 years	2
>10 years	3
Satisfaction of the handover procedure as it is	
Yes	6
No	4
Bedside handover preference	
Yes	6
No	4

DISCUSSION

Though its definition and purposes are clear, clinical handover is a process locally determined by factors characterizing the environment in which the former is held. There are a lot of studies in the literature referring to the procedure in different settings (emergency departments, surgical clinics, intensive care units, internal medicine departments, etc.) under different conditions (e.g. handover from operation room to ICU personnel, from emergency medical agencies to emergency department personnel, etc.) in various health systems (U.K., U.S.A., Australia, France, etc.) and following different protocols.[10-14]

This is the first attempt to describe details surrounding the methodology of handover which is currently being used in an ICU in Greece. We established that the structure of the handovers where mainly system-focused and generally followed the simple old rule "no news, good news". Education meeting that was held between the two phases did ameliorate the content and the quality of information passed over, and in some areas, proved to have a positive effect on certain aspect of handover like e.g. frequency of interruptions, infection status, relatives' issues and proposed management plan coverage. Feedback with results of the phase I and ways to improve them had also reduced the effect of missed information as measured by clinical outcome.

The main drawback of the present study is that is a single center study in a relative small ICU. The same applies for the survey conducted (few participants). There is need for larger, multicenter studies in order to establish whether there is a variety of structure of handovers which are currently being used in ICUs throughout Greece. It would be also interesting to study the efficiency of different forms of handover used in other health systems and settings, like e.g. the ISBAR handover tool, the electronic handover report, the ABC approach, SBAR and SOAP schemes and others (table 5).[15-17]

Table 5: Different approaches, schemes and tools for more efficient handover.[15-18]

Mnemonic	Element	Definition
SBAR	Situation	The clinical state of patient at time of handover
	Background	Patient's identification, demographics, medical and social history, medication (including those given in ICU), interventions in hospital
	Assessment	Evaluation of patient's condition, medical problem, need and prognosis; current management plan
	Recommendations	Advice given or discussion about future plans
SOAP	Subjective	Patients complaints, symptoms and other data compiled with history
	Objective	Data from physical examination, symptoms and other data compiled with history
	Assessment	Evaluation of patient's condition, medical problem, need and prognosis
	Plan	Current and future plans for investigations, treatment, education or any future actions
ISBAR	Identify	Name/age/ward/team
	Situation	Symptom/problem. Patient's stability
	Background	Date of admission. Past history. Drugs.
	Assessment & Action	Diagnosis. Impression. What have you done so far?
	Recommendation	What you want done: Treatment, evaluation, examination, review, plan
ABCD	Areas, Allocation	No of patient, where, triage
	Beds, Bugs, Breaches	Bed availability, infective patients
	Colleges,	Consultation/ help needed.
	Deaths, Disasters, Deserters	Death, disasters
	Equipment, External Events	Equipment availability, planning

No matter what kind of handover is chosen, we advocate that every medical unit should have a protocol about handover which should be subject to dynamic reevaluation. It is necessary to have frequent audit and comparison with the actual record of the patients which will allow the unit to have a feedback about the quality of the handover, its tendencies over time and its relations to clinical status of the patient (e.g. infection status coverage and bacteremia, etc).[18-19] Finally, another issue would be to record and try to explain various types of handovers among different countries. This study adds to the collective experience about the procedure around the world. And though may irrelevant to non-working in Greek medical system, it contributes towards finding a unified evidence-based way for conducting and monitoring clinical handovers.

CONCLUSIONS

Accurate handover of information regarding patients in intensive care units is essential for maintaining continuity and quality of care. It is also vital that, the process itself should incorporate a means of reminding staff that they may initiate change at any opportunity. Reflexive and "bottom-up" handover redesign can produce outcomes that harbor local fit, practitioner ownership and (to date) sustainability.

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REFERENCES

1. Bonnie P, Mishkin An. Best practices in shift handover communication: Mars exploration rover surface operations. Proceedings of the International Association for the Advancement of Space Safety Conference sponsored by ESA, NASA, and JAXA, Nice, France, 25-27 October, 2005.
2. Lardner R. Effective Shift Handover, Offshore Technology report – Oto 96003, Health and Safety Executive 1996;1-19.
3. Northern Territory Magistrates Courts. Inquest into the death of Peter Limbunya. Darwin, NTMC 057, 2008.
4. National Patient Safety Agency. Safe handover: Safe patients. Guidance in clinical handover for clinicians and managers. London: BMA, 2004. Available at http://bma.org.uk/search?query=handover. Accessed October 2013.
5. Australian Medical Association. Safe handover: Safe patients. Guidance in clinical handover for clinicians and managers. Canberra: AMA, 2006 http://www.ama.com.au/node/4064 (accessed October 2013).
6. Royal College of Physicians. Acute care toolkit 1-Handover. London: RCP, 2011 http://www.rcplondon.ac.uk/resources/acute-care-toolkits (accessed October 2013).
7. Standards for clinical practice guide. Clinical handover. Royal Australian College of General Practitioners. Melbourne: RAGCP, 2010. http://www.racgp.org.au/your-practice/standards/standards4thedition/practice-services/1-5/clinical-handover (accessed October 2013).
8. Australasian College for Emergency Medicine. Clinical Handover in the ED. Canbera: ACEM, 2010 http://www.acem.org.au/media/policies_and_guidelines/Clinical_Handover_in_the_EM.pdf (accessed October 2013).
9. Cheung SD, Kelly JJ, Beach C, Berkeley RP, Bitterman RA, Broida RI, et al. Improving Handoffs in the Emergency Department. Ann Emerg Med. 2010;55:171-80.
10. Symons NR, Wong HW, Manser T, Sevdalis N, Vincent CA, Moorthy K. An observational study of teamwork skills in shift handover. Int J Surg. 2012;10:355-9.
11. Brenier G, Minville V, Fourcade O, Geeraerts T. Medical handovers in ICU: a snapshot of practice in the South West of France. Ann Fr Anesth Reanim. 2012;31:208-212.
12. Piscioneri F, Chong GC. Surgical handover in a tertiary hospital: a working model. Aust Health Rev. 2011;35:14-17.
13. Murphy JN, Ryan CA. Handover rounds in Irish hospitals. Ir J Med Sci. 2011;180:27-30.
14. Miller A, Scheinkestel C, Limpus A, Joseph M, Karnik A, Venkatesh B. Uni- and interdisciplinary effects on round and handover content in intensive care units. Hum Factors. 2009;51:339-53.
15. Thompson JE, Collett LW, Langbart MJ, Purcell NJ, Boyd SM, Yuminaga Y, et al. Using the ISBAR handover tool in junior medical officer handover: a study in an Australian tertiary hospital. Postgrad Med J. 2011;87:340-4.
16. Farhan M, Brown R, Woloshynowych M, Vincent C. The ABC of handover: a qualitative study to develop a new tool for handover in the emergency department. Emerg Med J. 2012;29:941-946.
17. Ilan R, LeBaron CD, Christianson MK, Heyland DK, Day A, Cohen MD. Handover patterns: an observational study of critical care physicians. BMC Health Serv Res. 2012;12:11.
18. Iedema R, Merrick ET, Kerridge R, Herkes R, Lee B, Anscombe M, Rajbhandari D, Lucey M, White L. Handover--Enabling Learning in Communication for Safety (HELiCS): a report on achievements at two hospital sites. Med J Aust. 2009;190:133-6.
19. Lyons M, Standley TDA, Gupta AK. Quality improvement of doctors' shift-change handover in neuro-critical care. Qual Saf Health Care 2010;19:1-7.

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