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Research Article

Assessing the Effectiveness of the CcrISP™ Course-Time to Help our Surgical Residents Look After our Critically Ill Patients!

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Abstract

Background: The Care of the Critically Ill Surgical Patient (CcrISP™) course was introduced to general surgical residency in Singapore in early 2016. We performed a structured questionnaire study, given to all participants of the course to assess its effectiveness as well as the impact on their daily clinical practice.

Methods: A questionnaire designed to assess main content areas, course objectives and after workshop perceptions, was administered to trainers and participants after each course sitting. Fifty-one questionnaires were returned, comprising 12 instructors and 39 trainees.

Results: All key objectives were scored less than 2 by both instructors and trainees, meaning that they were addressed well. The overall cohort felt more confident in assessing the critically ill patient (4.33 ± 0.71), and would now use the CcrISP™ algorithm in their clinical practice (4.13 ± 0.85). Between instructors and trainees, trainees felt that the course did not allow participants to effectively communicate their concerns regarding patient care (P=0.000). Trainees were less satisfied with the mentoring process in the CcrISP™ course (P=0.008), and they agreed less that the clinical scenarios were realistic and practical (P=0.005). The instructors agreed more strongly that the cost of the CcrISP™ course is prohibitive for trainees (P=0.010). The possession of ICU experience was not a significant factor.

Conclusion: Our study has identified strengths of the course as well as areas for further emphasis in future. While the primary course objectives appear to have been met, the long-term impact of the course on practice and improvement of patient outcomes remain to be ascertained.

Keywords: CcrISP™; Critical care; Surgical training; Outcome; Education

Introduction

Care of Critically Ill Surgical Patients (CcrISP™) pose formidable challenges to even the most experienced surgeons. In reality, junior surgical staff is at the frontline of care provision in the emergency setting. With shortened and more focussed surgical residency training in Singapore, there are concerns about the standard of critical care management practised by the surgical residents [1]. Attention to detail in all aspects of care provision is key to achieving good surgical outcomes. Available evidence suggests that a post-operative adverse event is more frequent than reported [2]. A uniform peri-operative pathway may not always be patient centre das each patient has their unique needs. Unwell patients require urgent and appropriate evaluation and intervention to achieve optimal outcomes [3]. The first and most important step is to recognise that a patient is unstable. Yet, it is not uncommon to have patients referred to the Surgical Intensive Care (SICU) only after being critically ill for some time. This problem is usually compounded by the reluctance of trainees to seek help from senior colleagues, especially after office hours.

The CcrISP™ course is an initiative of the Royal College of Surgeons of England (RCSEng) to help address training needs of surgical trainees since 1996. CCrISP™ is a mandatory course for surgical trainees in the UK and Australia [4]. As of now, it is still not compulsory for surgical residents in Singapore. However, it has been

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endorsed by the Residency Advisory Committee (RAC) in General Surgery and may be a future requirement to clear junior surgical residency. The main objective of the course is to empower the junior trainees to identify and appropriately manage deteriorating surgical patients, before they deteriorate and require intensive [5]. CcrISP™ uses a three-pronged approach to provide a consensus approach to surgical critical-simultaneous assessment, resuscitation, basic investigations and chart analytics and ultimately deciding whether the patient is stable or unstable needing a higher level of care. By adopting the CcrISP™ algorithm, surgical trainees can minimise simple mistakes and avoid important omissions and allow sick surgical patients to be identified and managed early before deterioration and need for SICU. Course participants will by the end of the course:

a) Develop the theoretical basis and practical skills.

b) Be able to assess critically ill patients accurately.

c) Understand the subtlety and variety of presentation of critical illness.

d) Understand the importance of a plan of action in order to achieve accurate diagnosis and timely definitive treatment, and be able to formulate a plan of action.

e) Appreciate that complications tend to occur in a cascade and realize that prevention of complications is fundamental to successful outcome [6].

Changi General Hospital in the east of Singapore has collaborated with the RCSEng, making CcrISP™ available to loco-regional surgical trainees since January 2016. We have successfully completed seven runs of the course since, and are the first in Asia to have completed the new fourth edition.

The pressure to attend workshops during a compressed residency training program will naturally attract criticism and any new course such as CcrISP™ will be viewed sceptically from the establishment. Initially, the Advanced Trauma Life Support (ATLS) course was viewed to be too rigid in structure, some of the content was deemed incorrect, inappropriate for experienced staff, poor value for money and not sufficiently in tune with local practice when it was first introduced to the UK in the early 1990s. Furthermore, it has been suggested that courses should be designed to be tailored to the needs of a particular surgical specialty in view of how sub specialized we have become. These views have stimulated lively debate but for all that it is worth, there is little published data on trainees' opinions about CcrISP™, its relevance to their surgical careers and its value in the management of sick peri-operative patients.

The aim of this questionnaire study was to evaluate the effectiveness of the course by asking the participants who had just completed it for their views on whether the main objectives and key content areas of CcrISP™ were delivered successfully, and how trainees from the different surgical subspecialties regarded the course in terms of practical benefit and whether it will change their clinical practice.

Methods

We developed a questionnaire to assess the main course objectives and content areas of the course, as well as the perceptions of both trainers and trainees with regards to the mentoring process and effectiveness of communication, and impact on day-to-day clinical practice.

The questionnaire was distributed to participants (both trainees and trainers) of the sessions held in Singapore between Jan 2016 and Jan 2018, with the help of local CCrISP™ course coordinators. Once completed, questionnaires were returned to the investigators for tabulation. Each item was scored according to a scoring system, and entered into a SPSS database. Subsequently these data were analyzed to derive at a mean score for each item. For the course content, the score for each specific content area ranges from 1 to 5, with 1 representing "not addressed at all" and 5 representing "addressed too much". A mean score of 3.8 or more was considered to be "satisfactory outcome or well taught" and vice versa. Regarding the course objectives, responders can score each objective from 1 to 3, with 3 being "not addressed at all" and 1 being "addressed well". Lastly for questions pertaining to the course perceptions, the score ranges from 1 to 5, with 5 indicating "strongly agree" and 1 indicating "not applicable".

Statistical Analysis

Continuous numeric variables were reported as mean and standard deviation for parametric distribution and median (interquartile range) for non-parametric distribution. Categorical variables were reported as absolute number and percent, unless stated otherwise. Continuous numeric data were compared using the student t test or Mann-Whitney U test for parametric and non-parametric data, respectively. Categorical data were compared using the Chi-square or Fisher Exact tests. Statistical significance was assumed at $p<0.05$. The statistical analyses were performed using SPSS statistical software version 19.0 (IBM Corp, Armonk, NY, US).

Results

The baseline demographic of responders can be found in Table 1. The overall median age was 32.00 years (21.00-65.00), and 74.5% of responders were male. The majority did not attend any prior CCrISP™ course (80.4%), and 60.8% had previous ICU experience. The median length of ICU experience was 3.00 months (0.00-60.00).

Overall cohort

The mean scores of the questionnaire can be found in Table 2. Of all content areas, 57.9% and 42.1% were scored 3.8 and above by instructors and trainees respectively. In particular, the highest content areas scored by both instructors and trainees were "Assessing the critically ill surgical patient" (mean score 4.06 ± 0.24), followed closely by "Early recognition of critically ill patients" (mean score 4.00 ± 0.35) and "Utilization of clinical knowledge and/or acumen" (mean score 4.00 ± 0.45). In contrast, the lowest content areas scored were "Sedation practices in critically ill patient" (mean score 3.41 ± 0.85), "Procedural skills" (mean score 3.45 ± 0.86), and "Assessment of a patient with acute abdomen" (mean score 3.51 ± 0.90).

All key objectives were scored less than 2 by both instructors and trainees, meaning that they were addressed well.

In terms of overall perceptions, both instructors and trainees agreed that they feel more confident in assessing the critically ill patient (mean score 4.33 ± 0.71), and will now use the CCrISP™ algorithm in their clinical practice (mean score 4.13 ± 0.85). The area in which both instructors and trainees disagreed with was that "The course allowed participants to effectively communicate their concerns regarding patient care across" (mean score 1.82 ± 2.22).

Trainee *vs.* instructor

Between instructors and trainees, there were no differences in

Table 1: Demographics of responders.

Demographics	Overall (n=51)	Instructor (n=12)	Trainee (n=39)	P-value
Age (years)	32.00 (21.00-65.00)	39.00 (34.00-65.00)	30.00 (21.00-47.00)	0
Male gender (%)	74.5	91.7	69.2	0.867
Previously attended CCRiSP (%)	19.6	66.7	0.05	0
ICU experience (%)	60.8	58.3	61.5	0.842
Length of ICU experience (months)	3.00 (0.00-60.00)	2.25 (0.00-60.00)	1.00 (0.00-1.00)	0.845
Seniority				N.A
≥ Associate consultants	25.5	100	0	
Residents	74.5	0	100	

Table 2: Mean scores of overall cohort, instructors and trainees for content areas, objectives covered, and perceptions.

Question	Overall	Instructor	Trainee	P-value
Content area				
Assessing the critically ill surgical patient	4.06 ± 0.24	4.00 ± 0.00	4.08 ± 0.04	0.332
Management of respiratory failure and its prevention in surgical patient	3.96 ± 0.34	3.92 ± 0.08	3.97 ± 0.06	0.617
Management of cardiovascular disorders in critically ill surgical patient	3.92 ± 0.39	3.92 ± 0.08	3.92 ± 0.07	0.961
Management of shock and hemorrhage	3.92 ± 0.39	3.92 ± 0.08	3.92 ± 0.07	0.961
Cardiovascular monitoring and support	3.96 ± 0.40	3.92 ± 0.08	3.97 ± 0.07	0.665
Management of Sepsis and multiple organ failure	3.90 ± 0.50	3.92 ± 0.08	3.90 ± 0.09	0.909
Management of Renal failure in the critically ill patient	3.78 ± 0.58	3.83 ± 0.11	3.77 ± 0.10	0.74
Communication, organization and leadership in surgical critical care	3.78 ± 0.54	3.91 ± 0.08	3.74 ± 0.10	0.337
Nutritional management in critically ill patient	3.71 ± 0.61	3.75 ± 0.13	3.69 ± 0.10	0.778
Fluid and electrolyte management in critically ill patient	3.76 ± 0.62	3.67 ± 0.19	3.79 ± 0.10	0.536
Pain management	3.55 ± 0.76	3.50 ± 0.19	3.56 ± 0.13	0.8
Sedation practices in critically ill patient	3.41 ± 0.85	3.33 ± 0.26	3.44 ± 0.14	0.72
Management of multiply injured patient	3.63 ± 0.69	3.67 ± 0.19	3.62 ± 0.11	0.825
Assessment of a patient with Acute abdomen	3.51 ± 0.90	3.83 ± 0.17	3.41 ± 0.15	0.158
Procedural skills	3.45 ± 0.86	3.42 ± 0.19	3.46 ± 0.15	0.876
Multidisciplinary approach to care of the critically ill patient	3.78 ± 0.64	3.75 ± 0.18	3.79 ± 0.11	0.835
Management of the acute abdomen in critical surgical illness	3.84 ± 0.54	3.75 ± 0.13	3.87 ± 0.09	0.502
Early recognition of critically ill patients	4.00 ± 0.35	3.92 ± 0.08	4.03 ± 0.06	0.346
Utilization of clinical knowledge and/or acumen	4.00 ± 0.45	3.92 ± 0.08	4.03 ± 0.08	0.466
Objectives				
Develop the theoretical basis and practical skills necessary to manage the critically ill surgical patient.	1.47 ± 0.88	1.42 ± 0.23	1.49 ± 0.15	0.811
Be able to assess critically ill patients accurately and appreciate the value of a system of assessment for the critically ill .	1.43 ± 0.73	1.58 ± 0.26	1.38 ± 0.11	0.414
Understand the subtlety, variety of presentation of critical illness and the methods available for improving detection.	1.31 ± 0.62	1.33 ± 0.19	1.31 ± 0.10	0.901
Understand the importance of a plan of action in order to achieve clinical progress, accurate diagnosis and early definitive treatment.	1.37 ± 0.72	1.33 ± 0.22	1.38 ± 0.11	0.832
Be able to formulate a plan of action and involve appropriate assistance in a timely manner.	1.33 ± 0.68	1.33 ± 0.22	1.33 ± 0.11	1
Appreciate that complications tend to occur in a cascade and realize that prevention of complications is fundamental to successful outcome.	1.33 ± 0.65	1.33±0.19	1.33 ± 0.11	1
Be aware of the support facilities available and interact with nursing staff, other surgeons and intensivists/anaesthetists, being aware, in particular, of the surgeon's role in the delivery of multidisciplinary care to the critically ill.	1.39 ± 0.70	1.33±0.19	1.41 ± 0.11	0.741
Understand the requirements of the patient and their relatives during critical illness and be able to inform and support both.	1.45 ± 0.67	1.33 ± 0.19	1.49±0.11	0.494
Management and appreciation of complications in critically ill patients	1.43 ± 0.85	1.75 ± 0.37	1.33 ± 0.12	0.141
Perceptions				
Since attending the CCrISP course, I feel more confident in assessing the critically ill patient	4.33 ± 0.71	4.42 ± 0.15	4.31 ± 0.12	0.648
Since attending the course, I now use the CCrISP algorithm in my clinical practice	4.14 ± 0.85	4.08 ± 0.34	4.15 ± 0.12	0.804
I use the CCrISP algorithm to plan and write in the patient's notes after assessment? **If you are a trainee**	3.84 ± 1.03	NA	3.79 ± 0.16	NA
I feel that the instructors were able to effectively deliver the learning points of the course across? **If you are an instructor**	3.16 ± 1.96	4.13 ± 0.16	NA	NA
The course allowed participants to effectively communicate their concerns regarding patient care across?	1.82 ± 2.22	4.42 ± 0.15	1.03 ± 0.31	0
I am satisfied with the mentoring process in the CCrISP course?	3.02 ± 2.09	4.33 ± 0.19	2.62 ± 0.34	0.008
The clinical scenarios were realistic and practical?	3.13 ± 2.09	4.58 ± 0.15	2.70 ± 0.35	0.005
The cost of the CCrISP course is prohibitive for trainees?	2.88 ± 2.01	4.17 ± 0.30	2.49 ± 0.33	0.01

scores regarding the content areas and objectives covered. However, in terms of perception towards the CCrISP™ course, the trainees scored felt that the course did not allow participants to effectively communicate their concerns regarding patient care across (4.42 ± 0.15 *vs.* 1.03 ± 0.31, P=0.000), they were less satisfied with the mentoring process in the CCrISP™ course (4.33 ± 0.19 *vs.* 2.62 ± 0.34, P=0.008), and they agreed less that the clinical scenarios were realistic and practical (4.58 ± 0.15 *vs.* 2.70 ± 0.35, P=0.005). The instructors agreed more strongly than trainees themselves that the cost of the CCrISP™ course is prohibitive for trainees (4.17 ± 0.30 *vs.* 2.49 ± 0.33, P=0.010).

Impact of ICU experience

The possession of ICU experience was not a significant factor. There were no differences in mean scores between those with and without ICU experience regarding content areas, objectives covered, and overall perceptions.

Discussion

The majority of trainee participants agreed that the CCrISP™ course has empowered them with a necessary framework and practical skills to confidently and competently provide necessary care to sick patients. Until now, it is mandatory for surgical trainees to complete the Fundamental Critical Care Support (FCCS) course. The CcrISP™ course is 'by the surgeons for the surgeons' and the curriculum is engaging and interactive, which is cherished by trainees. There is less emphasis on didactic lectures. Interactive small group discussions, professional skills communication, ward rounds and moulage scenarios with patient actors, ensures all aspects of surgical care are covered. Each participant is assigned a mentor to help nurture the individual during the 2-day intensive course and a low participant to faculty ratio is ideal for more personal attention to enhance training needs. Candidates are given a handbook prior to the course and are tested on the curriculum using an online multiple choice question format exam on the RCSEng website. They will also have to pass an end of course moulage test, where they are actually placed in a simulated real-life scenario of a sick peri-operative patient requiring resuscitation and definitive treatment. Communication skills are also tested not only at a medical colleague level but also between patient and doctor interactions. Candidates are placed at times in the "Kobayashi Maru" or no-win scenario designed to test their decision-making under pressure. In our surgical careers, there will inevitably be infections that are resistant to treatment and anastomosis that leak and at worse patients whose lives we fail to save. Surgeons have to know how to cope with failure at its most poignant and unfortunately it is not like failure in most other professions and this concept should be learnt early on.

However, among the content areas identified as inadequately addressed, both trainers and trainees identified nutritional assessment of critically ill patient, pain management, sedation and management of the multiply injured patient as the most important. These areas should obviously be targeted in future courses, with greater emphasis by instructors. Alternatively, supplementary courses like the Advanced Trauma Life Support (ATLS) may help to fill in the gaps of knowledge in managing patients with polytrauma. Other aspects that warrant greater emphasis are practical skills including procedural skills, and the multidisciplinary approach to care of the critically ill surgical patient. Hence, use of manikins, simulated patients and animal models can simulate a realistic but safe environment to practice procedural skills that the trainees may come across during contact with critically ill surgical patients.

Cost was thought to be prohibitively high by the instructors, but trainees felt otherwise. The reasons for the observed difference may be multifactorial- some trainees may receive funding from the sponsoring institutions while some may feel that benefits outweigh the expenditure on the course fee.

Our findings are in keeping with a study by Waxman et al. [4] involving Australian surgical trainees. In the above study both trainees and instructors identified communication skills and the management of shock and haemorrhage as well taught areas of the course. Similarly, both groups also identified procedural skills as an area that may be better addressed in future CCrISP™ courses. Another aspect that was identified as a weakness in both studies was the mentoring process, although the instructors in the current study were generally more satisfied with the mentoring process than the trainees. This was attributable to the informal nature of the mentoring process within the Australian setting in comparison to a more structured process in the local setting, where instructors were encouraged to provide objective and structured feedback.

Despite the encouraging findings, these must be interpreted in the context of known limitations of subjective, qualitative studies. Hence, future research should concentrate on adopting an objective, outcome-based approach. An audit of the electronic medical records, for instance, can be performed to identify changes in outcomes regarding management of critically ill patients by surgical trainees.

The Residency Advisory Committee (RAC) for surgery has recently approved this course as relevant and is approved as an alternative to other mandatory courses. In the "Handbook for PGY1s", the National Assessment Committee for PGY1 states the 7 professional activities, which are "skills that a doctor can progressively be entrusted to perform competently when entering into unsupervised practice" (Supplementary Table 2). CCrISP™ helps surgeons-in-training to develop and perform these skills in the early stages of their training. We foresee that more surgical trainees will welcome CcrISP™ and benefit from it. We highly recommend residents to consider CcrISP™ in their portfolio to enhance their care of our sickest patients.

Conclusion

This qualitative study has shown that early recognition and assessment of the critically ill patient, management of shock and hemorrhage, management of cardiovascular and respiratory failure were strengths of the CCrISP course, while aspects of practical skills and multidisciplinary management were areas that require further refinement. Importantly, a follow-up study is necessary to provide an objective assessment of the course regarding its impact on patients' outcomes.

Contributorship Statement

Tang TY, Mah CL and Lee AC are the CCriSP™ course co-directors in Singapore. TTY came up with the original idea and framework of the study. Wee IJY, PAHR Rathnaweera and Lim MNHH drafted the initial versions and collected prelim data. PAHR Rathnaweera, Shelat V, Bryden DC, Mah CL, Lee AC and Tang TY edited and approved the final version of the letter.

Main Messages of Article

1. Strengths of the CCrISP™ course: Early recognition and assessment of the critically ill patient, management of shock and hemorrhage, management of cardiovascular and respiratory failure.
2. Areas of improvement for CCrISP™ course: Practical skills and multidisciplinary management.
3. Follow-up is necessary to provide an objective assessment of the course regarding its impact on patient outcomes.

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References

1. Smith GB, Poplett N. Knowledge of aspects of acute care in trainee doctors. Postgrad Med J. 2002;78(920):335-8.
2. Vincent C, Neale G, Woloshynowych M. Adverse events in British hospitals: preliminary retrospective record review. BMJ. 2001;322(7285):517-9.
3. Campbell H, Hotchkiss R, Bradshaw N, Porteous M. Integrated care pathways. BMJ. 1998;316(7125):133-7.
4. Zotti MG, Waxman BP. A qualitative evaluation of the Care of the Critically Ill Surgical Patient course. ANZ J Surg. 2009;79(10):693-6.
5. White RJ, Garrioch MA. Time to train all doctors to look after seriously ill patients--CCRISP and IMPACT. Scott Med J. 2002;47(6):127.
6. Lim M, Bhagya SL, Shelat VG, Mah CL, Lee AC, Tang TY. CCrISP course: time to help our surgical residents to look after our critically ill patients! Postgrad Med J. 2021;97(1143):65-6.