This Is My Unit: Surgical ICU, BG Klinikum, Hamburg, Germany

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This article provides insight into a German intensive care unit in a surgery department. It describes the nursing care, nursing management monitoring and infection surveillance practices of the unit. We also describe the national educational pathway of a German nurse, which differs from those in other countries. The overview can help understand the context of German critical care nursing.

Keywords: nursing care and management, nursing patient ratio, nursing education process, monitoring and infection surveillance

INTRODUCTION

I work as a senior nurse in the Surgical Intensive Care Department at the BG Hospital (Berufsgenossenschaftliches Krankenhaus [BGKH] — occupational accident hospital) in the south east of Hamburg. There are a total of nine BG hospitals and two outpatient clinics, which are managed by the hospital association of the statutory accident insurance in Germany as they hold the majority of shares within the BGKH.

At BG Hospital, we are committed to our legal mandate, which is "to heal and to help with all appropriate means." These values form the basis of our efforts in order to meet the legitimate expectations of our patients, relatives, employees, and customers. Our mission statement can only be effective if it determines our actions. All employees are therefore obliged to respect and live up to these principles in the working world.

As a supraregional trauma center, nine specialist departments provide state-of-the-art care to severely injured people in the acute area, allow earlier rehabilitation where possible, and deliver outstanding outpatient treatment. Specialized departments include orthopedics, trauma and sports medicine, neurosurgery, septic accident surgery, hand, plastic and microsurgery, severe burns center, neurology, rehabilitation medicine, and the largest cross-border paraplegics center in Germany. All of that together make us unique compared to the other 50 hospitals in Hamburg. Our catchment area covers the whole north of Germany. We also receive and treat patients from other hospitals within Germany and repatriate German nationals from abroad, for example, if they had an accident at work or while at holiday (worldwide).

THE UNIT AND THE PATIENT PROFILE

The 18-bed intensive care department includes 6 burns and 12 surgical beds, all of which are equipped to deliver mechanical ventilation to patients. The surgical unit mostly treats patients with mixed surgical primary admission diagnoses who may or may not have developed secondary complications such as acute and chronic kidney failure, chronic obstructive pulmonary disease, acute respiratory distress (ARDS), sepsis, or other respiratory or circulatory issues. Patients after skin transplants have the shortest stay with us. We provide care to patients with respiratory or circulatory instability, or need of

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neurological monitoring, but also to patients who have developed life-threatening infection until stabilization.

The rooms accommodate one to two people; Four single rooms are mainly used for patients with infections requiring isolation. These rooms are also suitable and equipped for renal replacement therapy, especially for dialysis. Inside all patient rooms we can use the most commonly applied modalities of continuous renal replacement therapy, the continuous venovenous hemodiafiltration renal replacement therapy (CVVHDF). All rooms have windows allowing for natural light, promoting a normal day and night rhythm for the patient, yet a special light system in the rooms gives the possibility to individually adjust for the patient's needs. Television and WIFI are available free of charge. We use different call buttons. According to the motor functions of the patient a variety of call buttons can be used, which may be activated by the mouth or head via a sensor. There are a variety of beds and four different mattress systems available (air chamber, foam, and air fluid or normal) to prevent pressure injuries, and promote patient comfort.

Next to the main unit, we have a visitor's corner where relatives or friends can retreat and relax, while their relative is being looked after. There is a seating area with water and coffee. Next to this area is the bureau of the physician, in case the relatives have questions or the physician would like to have some conversation. There are some flyers and brochures (also online on our homepage) (BG Klinikum Hamburg Traumatologische Intensivstation, ICU flyer/ Delirium flyer/ delirium brochures [n.d.]) about ICU specific topics such as wounds, hygiene, delirium, and what relatives and friends can do to support the patient, as well as information about the hospital and its surroundings, that is, nearby hotels, public transport.

The average length of stay for patients within the ICU department was approximately 7 days in 2015. Some of the delayed discharges from the ICU are due to bed shortages on the general wards. The severity of our polytrauma patients is assessed according to the Injury Severity Score (ISS). The ISS is an anatomical injury degree table to classify the severity of an injury. The assessment is based on the severity of individual injuries in accordance with the simplified Abbreviated Injury Scale (AIS).

The ISS table includes values between (inclusive) 0 and 75. For other patient types, we use the APACHE II (Acute Physiology and Chronic Health Evaluation II) scoring, SAPS II (Simplified Acute Physiology Score II), TISS-28 (Simplified Therapeutic Intervention Scoring System), and SOFA (Sequential Organ Failure Assessment).

MONITORING AND INFECTION SURVEILLANCE

On admission, all patients receive a bacteriological methicillin-resistant *Staphylococcus aureus* (MRSA) screen. Samples are obtained from different sites and are repeated weekly. If necessary, patients are treated with antibiotics based on a susceptibility testing. There is a range of different monitoring techniques and equipment available to deliver best therapy and provide a safe setting for patients with a variety of critical circumstances. If patients require a video bronchoscopy or CVVHDF it can be arranged immediately. In addition to the usual monitoring, patients with sepsis receive more advanced intravascular cardiac output monitoring. A combination of a multilumen central venous catheter or Sheldon catheter and an arterial pulse contour cardiac output catheter line deliver specific data and calculations enabling the clinician to optimize hemodynamics and fluid management. The device can also be used for patients with shock, ARDS, polytrauma, severe heart failure, burns, or major operations.

Neurosurgical patients often require specific monitoring and interventions, such as measurement of intracranial pressure and cerebral perfusion pressure via a ventricular probe; and bispectral index monitoring to assess the level of consciousness. Neurosurgical patients benefit

from a calm environment as they can be easily distressed by high noise levels. We try to avoid the noise within the ICU setting by monitoring with a SoundEar noise warning system. The SoundEar is a visual lightning system (with green, yellow, and red lights). If the lights are red, you have to be quieter. The decibel numbers must be set and it is in the patient room the whole day. Patients with polytrauma often receive thoracic or other special drains. Monitoring of intra-abdominal pressure may be necessary, internal or external fixations or even halo fixation devices to stabilize the atlas. All monitoring, fluid and medicine management is registered at the electronic patient data management system. The automatic documentation from selected medical devices and manual documentation of the nursing care and examination, as well as medical examination and laboratory findings are captured by the system. Every member of the ICU staff has an ID Code to access the system. In order to access hospital standards and guidelines, it is connected to the hospital information system. The fluid management system cooperates also with another monitor system. ICU nurses can see on an extra monitor at the surveillance zone, in how many minutes is the next infusion due to change. The responsible nurse can organize her work better.

NURSES

Our unit employs staff nurses and nursing assistants. Approximately 50% of nurses have attended the specialist critical care education pathway and hold a certificate of specialist critical care, which takes 2 years to complete. To enroll in the specialist critical care pathway, a general nursing qualification (3 years nurse training or 4 years bachelor degree) and at least 6 months critical care practice are necessary. During the critical care training program, the nurses have to work in different intensive care departments in order to develop advanced skills and to familiarize with other specialized areas, which they will not necessarily encounter within their own units. This can inform alternative approaches in critical care nursing. At the end of the critical care specialist pathway, the students have to write an assignment including a small research project addressing a critical care problem.

All nurses can participate in an online clinical nurse education program, where they are required to complete different tests on different topics or attend congresses and postgraduate courses within or outside the hospital. It is also possible to work toward a bachelors or master's degree; however, nurses have to organize this privately. At my unit, we have only one nurse who holds a masters, and two nurses with bachelor degrees. However, I believe that academic nursing studies will begin to attract more nurses, as they promote professionalism and provide a sound academic background, which strengthens the voice of nursing.

Fulltime nurses work 38.5 hours per week. Every nurse has to care for 2.5 patients during the day (1:2.5) shift and 3.5 (1:3.5) patients at night shift. This nurse-to-patient ratio for ICUs has been regulated by the Minister of Health since 2020. In 2021 it will be regulated to two patients at (1:2) day shift and three patients at night shift (1:3) (Bundesgesundheitsblatt, 2019; The Federal Law Gazette, 2019) based were on negotiations between hospitals and health insurance companies. Before 2020 there were no national standards for ICU staffing ratios.

New members of staff receive a 3-month monitored supernumerary orientation, which is organized by four instructor nurses. We also train nursing students in the end of their general nursing training program, as well as other students from the critical care pathway.

NURSING CARE AND MANAGEMENT

Our team includes several link nurses specialized in topics such as ergonomics, hygiene, the patient data management system, as well as nurses who are responsible for the maintenance and updates of care standards. The link nurses keep the team updated, and supervise and advise the staff. Since 2015, we have had one advanced practice nurse

(APN) for critical care. Law requirements for the role of a nurse practitioner (NP) have not yet been implemented in Germany, but specific competencies of ANP for NP exist. Our APN currently implements the supervision and management of care problems and the development and implementation of various scoring systems, for example, pain, delirium (BG Klinikum Hamburg Traumatologische Intensivstation, ICU flyer/ Delirium flyer/ delirium brochures), and sedation. As an APN, she is allocated directly to patient care and follow ups. Additionally, she is allocated 2 days a week to review research evidence and to promote evidence-based practice. These are the first steps for our hospital to develop a more academic approach to nursing practice, which hopefully will continue to progress. As an APN, she has the opportunity to build a bridge between research and implementation of evidence into practice, as well as act as a role model and motivator to colleagues while instigating special protocols, for example, best practices for ICU delirium.

Our management team consists of one unit manager and the deputy sisters, of which two are in full- and one in part-time posts. For sepsis monitoring we use the SOFA score in our Patient Data Management System. We manually enter the data electronically every day. For delirium screening we use the CAM-ICU (Confusion Assessment Method for Intensive care Units) every 8 hours. We identify 13 nursing areas for quality improvement. Our APN identified these nursing areas in her masters and implemented the standard. As our ICU standard, which describes the nonpharmacological interventions of delirium prophylaxis/treatment, for example, orientation or early mobilization. Further, we use the NRS (Numeric Rating Scale) for pain assessment in patients, who are awake and can speak, and the ZOPA Score (Zurich Observation Pain Assessment) for patients who are unconscious or cannot express themselves verbally. For sedated patients we use the RASS (Richmond Agitation Sedation Scale). All of these data are located at the PDMS. In order for patients to better remember and organize their memories of their ICU experience we have begun to write ICU diaries for our ventilated patients (>24 hours). Some patients wish to visit the unit after their recovery and see the rooms and equipment. This may help them to make sense of their traumatic experience and help to deal with post-traumatic stress, which is common in patients after intensive care treatment.

Our team works well together and we support each other during physically and mentally challenging tasks. We encourage new ideas and leave room for discussions. During break time the team is split into two groups so that patient safety is maintained at all times. Meanwhile, each nurse group is taking care for all other patients on the ICU.

A challenge arises when a nurse has to care for two or three patients, especially if they are in different rooms, as this may compromise patient safety. It is particularly difficult if one or two patients are isolated or have one or more life-supporting equipment to operate. Such situations highlight the urgent need for legal regulation of patient care standards in German ICUs. A few nursing associations are advocating for 1:1 staffing ratio in ICU nationally. After intensive care, patients are transferred to the ward for specialist care, for example, aseptic surgery. If rehabilitation is necessary for neurological or spinal cord injury patients, this can be carried out in our hospital. We have two wards for long-term ventilated patients, where the weaning can be continued if necessary. Geriatric patients are transferred to another hospital for geriatric rehabilitation.

MULTIDISCIPLINARY TEAM MEMBERS

We are collaborating closely with ergotherapists, logotherapists, microbiologists, surgeons' radiologists, who overall visit ICU patients once a day.

A physiotherapist is present almost throughout the day to provide physiotherapy and exercise. Patients are transported to the computed tomography (CT) or magnetic resonance tomography (MRT) by the anesthesia or ICU nurses.

At each morning shift we hold a multidisciplinary team meeting about every patient with anesthetists, physiotherapist, all critical care nurses and once a week with pastoral care. The daily goals for the patients are discussed (Kumpf et al., 2017). The daily goals during the ICU visit should be set with the involvement of all professions, who are working there. The following points can be taken into PDMS:

- Coordination of communication (consoles/relatives/further treatment facilities)
- Therapy goals/changes of therapy goals
- Goals for analgesia, sedation and delirium management
- Ventilation/weaning/respiratory therapy
- Circulation/fluid balance
- Nutrition
- Infection management
- Need for catheters and other invasive procedures
- Preventive measures (anticoagulation/decubitus/stomach protection/mobilization/special physiotherapy measures)
- Planned measures (diagnostic/therapeutic)
- Coordination of medication

The families are not been engaged yet. Maybe it will be in the future. The patient will become involved if he is orientated or awake. Then the nurse or the anesthetics will inform the patient about the plans and what has happened.

RESEARCH AND DEVELOPMENT ACTIVITY

Our hospital is not affiliated with a university; therefore, research is not a part of our daily practice yet. However, some research projects are being developed by the medical team with focus on surgery and emergency medicine.

Regarding pain assessment and critical care nurses' knowledge, the APN administers validated surveys at two time points to determine gaps and needs for improvements. Overall, APNs evaluate scoring systems and perform risk analyses to identify needs and benefits for the ICU, critical care nurses, and the patients.

The anesthetists and critical care nurses are involved in an APN- and senior physician-led implementation of the 10 Quality criteria for ICUs of the DIVI (German Interdisciplinary Association for Intensive Care and Emergency Medicine) (Kumpf et al., 2017). The 10 quality indicators (QI) consist of the following areas: QI 1 Daily multiprofessional and interdisciplinary clinical visits with documentation of daily goals, QI 2 Management of sedation, analgesia, and delirium, QI 3 Patient-adapted ventilation, QI 4 Early weaning from invasive ventilation, QI 5 Monitoring of infection prevention measures, QI 6 Infection management measures, QI 7 Early enteral nutrition, QI 8 Documentation of structured patient and family communications, QI 9 Early mobilization, Q10 Describes the relevant areas in medicine and nursing on ICU. These criteria are based on current international evidence-based guidelines and recommendations, and they are regularly updated. An evaluation is carried out on a yearly basis. Moreover, delirium, agitation, pain, pressure injuries, and sepsis rates are evaluated every 6 months. Central line-associated bloodstream infections (CLABSI) are evaluated by the senior ICU anesthetist. SAPS (Simplified Acute Physiology Score) for mortality prediction, and the TISS-28 as a measure of care workload, are evaluated by the anesthetists and in some ICUs by the nurses in Germany.

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