

Efficacy Of Digital Operating Room Technology , Role Of Nursing, Anesthesia And Radiology Team In OR Safety

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Abstract

Nowadays, operating rooms (ORs) are inefficient and overcrowded, and the turnover between cases is frequently lengthy and varied. In addition, the turnover rate is not consistent. The introduction of new technologies and devices into an environment that is already technologically complex is frequently done in a completely random manner. Both the data and photographs pertaining to patients are not integrated effectively or displayed in a timely manner. The system is put under additional strain as a result of the lack of integration of technology and information, which leads to further decreases in both efficiency and effectiveness. As a consequence, this may have an effect on the prices and the safety of patients. In order to improve efficiency, enhance safety, and lower the cost of care, it is vital to strengthen the integration of high technology, as well as to engage in teamwork, improve communication and coordination among services, providers, and personnel. Despite the fact that these daily realities are present, the conventional operating room is undergoing a transformation as a result of the introduction of new technology and paradigms into the clinical setting. Nursing, anesthesia and radiology team play a very important role in OR safety, as they form an excellent team in all aspects of collaboration.

Keywords: *new technologies and devices into an environment that is already technologically complex is frequently done in a completely random manner.*

Introduction

Clinical practice is becoming increasingly informed by software such as electronic health records (EHRs), which is driving the digital transformation of health care, which is occurring at a rapid pace. Electronic health records (EHRs) have become widespread in the United States as a result of the implementation of government incentive programs. The widespread adoption of EHRs has further fueled the development of information technology systems within the health care industry, such as software for billing and laboratory systems. The rapid development of vast numbers of electronic forms of patient data provides a number of advantages for the health care industry, including the ability to store the data electronically, the ease with which it may be disseminated, and the expansion of its usage in either clinical, research, or business-related procedures. There is a wealth of data in the perioperative environment, and the administration of anesthesia results in the generation of a significant amount of patient information that has the potential to be recorded for later use in secondary clinical or operational settings [1,2]. Data in the health care industry has been referred to as "big data," and the rise in the number, variety, and speed with which it is generated has made it difficult to store and utilize the data that has been collected in the past. As a result of this shift, the field of biomedical informatics and the subfield of clinical informatics have emerged as distinct academic disciplines. For the purpose of capturing, storing, manipulating, and visualizing data in order to transform it into information that can be utilized, modern methods and tools have been developed. Artificial intelligence that has been trained on the data that has been gathered may, at some point in the future, be able to provide predictive analytics that influence clinical decision-making in real time in the operating room [3].

From the perspective of the perioperative environment, anesthesiologists are at the vanguard of the digital transformation that is taking place in the health care industry. It is necessary for anesthesiologist-informaticists to struggle with the efficient utilization and optimization of electronic health records

(EHRs) and anesthesia information management systems (AIMS). Issues have been raised regarding the high costs of AIMS as well as its resistance to changes in clinical work patterns [4]. Despite the fact that AIMS have been proved to have various benefits, including improvements in clinical documentation and reimbursement, there have been other issues. Researchers in the field of clinical informatics are starting to make use of the data that is gathered in these systems in order to enhance patient safety, quality, and subsequent care outcomes. Two examples of attempts to reuse electronic data for research are the National Anesthesia Clinical Outcomes Registry managed by the Anesthesia Quality Institute and the Multicenter Perioperative Outcomes Group, which gathers data from more than thirty anesthesia departments [5]. Both of these organizations are examples of initiatives to reuse electronic data.

Invasive procedures are gradually being replaced by less invasive and even noninvasive ones. This trend is expected to continue. Telesurgery, image-guided operations, robotic surgery, and minimally invasive surgery are all examples of surgical techniques that are gradually replacing traditional surgical methods. Single-incision laparoscopic surgery and natural orifice transluminal endoscopic surgery are two approaches that are continuously developing and transforming laparoscopic operations. Image-guided vascular access technology and other endoscopic access techniques have made it possible to do procedures that previously required the use of general anesthesia. Ablation of tumors, as opposed to resection, can be achieved through the utilization of imaging-guided radiofrequency ablation, microwave treatment, cryoablation, lasers and interstitial laser therapy, focused ultrasonography, and focused radiation [6].

A medical specialty that is at the interface of health systems science, clinical care delivery, and information technology is known as clinical informatics. When it comes to electronic health record (EHR) administration and regulatory reporting, data communications, and health information interchange, all informaticists, including anesthesiologist-informaticists, are required to have a comprehensive understanding of the

issues involved. The overall goals of this specialization include making an effort to improve the utilization of electronic health records (EHRs) and the data that is included within them. Furthermore, anesthesia informatics incorporates many specialty-specific problems and competencies that are associated with the utilization of the informatics body of knowledge in perioperative clinical and research settings. The goal of anesthesia-informaticians is to enhance the workflows of clinicians, as well as the safety of patients and the quality of care provided in the perioperative setting [7].

Review:

The term "health care information technology" (HIT) is not identical with "informatics," and clinical informaticians are not the same as HIT specialists. The operational management of company computer systems, software, and resources is what is meant by the term "information technology," which is a practical subject. In contrast to health information technology (HIT), clinical informatics is a scientific discipline that encompasses both theoretical and practical knowledge concerning the utilization of information to enhance systems in the health care industry. Its primary objective is to address the triple aim of improving the quality of care for both populations and individual patients, as well as bettering the cost-effectiveness of care. An rising number of requests have been made to clinical informatics in order to solve issues concerning provider satisfaction, burnout, and the equality of care delivery. The installation and optimization of electronic health records (EHRs), the reuse of data from EHRs, the development of computerized decision support tools, and the protection of the confidentiality and safety of health care information systems are some of the notable objectives of the informatics specialty [8].

Clinical informatics is a subspecialty of medicine that involves the clinical treatment of patients, an understanding of information technology, and a systems-based understanding of the environment in which health care is provided. As a result, informaticists are required to have a comprehensive understanding of medical

knowledge, informatics, the health care system, the evaluation and function of health care information systems, human aspects, including the manner in which clinicians engage with those systems, and the ability to lead and manage change within organizations. Managing teams, having a comprehension of the discipline of project management, and having the ability to effectively plan both strategically and financially for health information systems are all included in the latter [9].

There are a variety of positions available for medical professionals who specialize in clinical informatics. At a number of hospitals and health care organizations, an executive-level position known as the chief medical informatics officer or chief clinical informatics officer has been established. This physician, who typically reports to either the chief medical officer or the chief information officer, or both, acts as a bridge between the clinical concerns of the medical staff and the technical requirements of an organization's health care information technology. It is possible for her to give clinical oversight for the electronic health record and to delegate requests for informatics resources for the sake of clinical research, business intelligence, or research. An additional usual position for physicians is that of the physician champion, who frequently participates in the adoption of electronic health records (EHR), continuous optimization, and provider education. Those who work in clinical informatics are expected to have core competencies in leadership and change management. Physician champions and chief medical informatics officers are both involved in the process of managing the organizational change that is associated with the adoption of electronic health records (EHR) and related clinical workflows [10].

Technology has become an indispensable component of the healthcare industry and has completely revolutionized the way medical procedures are carried out. The performance of surgical procedures has been enhanced by cutting-edge digital technology, which have also contributed to the preservation of the patient's quality of life. With the assistance of these technologies, even people who have serious medical complications can keep their health in good condition [10]. Through the

implementation of Artificial Intelligence (AI), machine learning, the Internet of Things (IoT), and blockchains, the healthcare industry has undergone a revolutionary transformation, and the use of these technologies has expanded beyond the limitations that were anticipated. It has been demonstrated that robotic surgery is more effective than traditional surgical techniques [11], making it the most promising use of these technologies at the advanced stages of their development. There are a multitude of digital applications and technologies that are assisting medical practitioners in monitoring the real-time health state of patients, even when they are not physically present. After a number of years of research, these digital gadgets have become significantly more sophisticated and sensitive, and they operate according to the algorithm developed by the scientist [12]. The rates of recovery for patients are dramatically increasing as a result of these gadgets. Users are able to manage their everyday lifestyle routines with the help of wearable devices. In recent times, the progression of digital technologies is causing a shift in the way that healthcare is conceptualized. These days, digital devices are primarily comprised of built-in functionality regarding the process and practice of healthcare [12].

Within the specific anatomic environment of the individual patient, the necessary components of the revolution in image-guided surgery will make it possible to perform tailored simulations, preprocedural planning, and rehearsals of the surgical operation that is planned to be performed. The planning of surgical procedures will be more exact, and the therapy will more specific. A totally simulated environment makes it possible to imitate, test, and modify the workflows and procedures that are actually carried out in an operating room (OR) in order to meet the requirements of the patient and to maximize the efficiency of the actual surgical team executing the procedure. For the purpose of determining how individuals respond to human-machine interfaces, simulation will be utilized. It is possible to gain an understanding of whether new technologies and processes hinder or help workflows, whether new problems are created, or whether improvements will be made to both safety and performance [13].

Not only will the usage of simulation become a prerequisite for teaching and staff training in order to shorten learning curves and improve performance and outcomes, but it will also be required in order to test concepts and systems prior to their introduction in order to find the most effective way to adopt and implement new technologies. It is imperative that surgeons embrace and make use of simulation in order to enhance performance and outcomes for their patients. If they do not, they will be forced to confront the fact that the payers and legal system will require its adoption [13].

At some point in their life, a great number of individuals will be exposed to anesthesia in connection with surgical procedures or medical treatment, either as a patient or as a relative. During the process of administering anesthesia, sedative medicines are administered. These drugs induce major organ systems, such as the circulatory and respiratory systems, to undergo alterations. For the purpose of providing safe anesthesia care, specialized health care professionals (HCPs), such as anesthesiologists and nurse anesthetists (NAs), ensure that the important organ functions of the patient who is under anesthesia are maintained and properly monitored. During the anesthesia process, the nurse anesthetist (NA) stays in close proximity to the patient and is responsible for providing life support and supervision. Individuals who have completed one year of post-graduate academic studies in Sweden are considered NAs. The induction, maintenance, and termination of anesthesia are all performed by NAs with the assistance of anesthesiologists. It is important to monitor the patient's vital signs (VSs), which include blood pressure, pulse, and oxygen saturation, as these parameters can provide an early signal of potential problems that are about to occur. Surveillance comprises monitoring these vital signs. Over the course of the last few decades, there has been a significant improvement in monitoring, which is an essential component of patient safety in anesthetic care. The assessment of additional sources of information, such as the patient's facial expression (whether it is tense or relaxed), skin color (whether it is flushed or pale), and so on, is also included in the process of surveillance. The Nurse Anesthesiologist (NA) has a number of significant obligations

and plays a pivotal role in ensuring that patients receive safe anesthesia [14].

Conclusion:

Through the use of computerization, the health care industry has undergone a transformation, and the implementation of electronic health record systems has become ubiquitous. Records of the administration of anesthesia are typically kept in the operating room by means of anesthesia information management systems, which are extensively utilized in this setting. The perioperative environment and the practice of anesthesia provide a significant amount of data that can be utilized for the purpose of supporting clinical decision-making, research, and the improvement of processes. It is possible for anesthesiologists who have received training in clinical informatics to assist in the implementation and optimization of anesthesia information management systems. These individuals are also known as informaticists or informaticians. Additionally, they might take part in clinical research, the management of information systems, and quality improvement initiatives in the operating room or throughout an entire health care system. From the point of view of the anesthesiologist-informaticist, the following topics are discussed: the management of perioperative information systems; the implementation of computerized clinical decision support systems in the perioperative environment; the role of virtual visits and remote monitoring; perioperative informatics research; the improvement of perioperative processes; leadership; and the management of change.

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