Mobile Phones – Ban or Boon?

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Use of cellular phones or ‘mobiles’ is common, while most hospitals have restrictions on their usage in critical areas such as the adult and neonatal intensive care units (ICU), operation theatres (OT) and acute wards due to perceived deleterious interactions of electro-mechanical frequencies (EMF) emitted when in proximity with vital electronic medical devices. Anecdotal reports of death caused by a respirator being switched off by electro-mechanical interference (EMI) from a mobile phone raised the question of patient safety.

Radiation emitted by the phones causes the medical equipment to become a radio-receiver. An increase in the baseline ‘noise’, display of incorrect values, change in the alarm settings in monitors, interference with myopotentials in electroencephalographic (EEG) and electrocardiographic (ECG) machines and decrease in the cutting power of electrocautery have been reported. Readings of implantable pacemakers as well as the input selection of defibrillators have also been affected. This assumes clinical significance in critical areas of the hospital where fears of patient safety make banning the use of mobile phones appear logical. However, ‘clinically relevant EMF’ has not been defined [1,2]. The problem was further compounded by the non-uniformity in the reporting of the mal functionings. Episodes were either categorized as those resulting in “interrupted function”, “faulty action”, such as altering of an infusion pump rate or “switching-off” of a device. Simple screen interference or sounds not altering recordings were not considered clinically relevant. Finally, “silent” malfunctions caused by EMI (i.e., the equipment may operate slightly outside its normal range, but not enough to trigger an alarm) are difficult to record and quantify.

EMI does not completely disappear on placing the mobile phones on stand by modes and is more with those phones which are incompatible with medical equipments [2]. Most phones operate on the Global Systems Mobile (GSM) network where two frequency bands are

allocated, one at 900 MHz and one at 1800 MHz. Most medical equipments have a resonant frequency of 1600 MHz [3]. An inverse relationship between distance and intensity of interference is seen. The maximum distance at which the phones cause interference has been reported as two meters and phones closer than 88 cms created the maximum interference [1].

However, fear of the interference appears more conjectural than real. At least 4% of medical devices experience clinically relevant EMI when a mobile phone is within two meters. However, the number of events when mobile phones are used at a distance of more than one meter from medical equipment are almost negligible, with only 0.01% of all devices tested at 900 MHz showing clinically relevant EMI [4]. At the Mayo Clinic in 2005, in 510 tests performed with 16 medical devices and six mobile telephone brands, the incidence of clinically important interference was 1.2% [1]. There is now a general world-wide trend towards relaxation of regulations regarding use of mobile phones in hospitals [5].

Another controversy of possible bacterial contamination with mobile phones has emerged. Hospital equipments, especially those in the critical care areas have to be not only of a high technical standard but also have hygienic standards. Rafferty et al [6], found a 7% rate of bacterial contamination with potentially pathogenic bacteria (PPBs) when investigating telephones, intercoms and dictaphones used in patient care areas. 80% of the personal stethoscopes of physicians were found to be contaminated by PPBs when 200 stethoscopes were surveyed [7]. This was probably because a physician’s stethoscope is not included in routine hospital cleaning. Other ‘personal’ work tools such as ball point pens were also found to be highly contaminated (ranging from 65-94%) [8].

Electronic communication devices (i.e. mobile phones, personal digital assistants) are being increasingly used

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in close proximity to patients by the visitors and health care providers. It will be a strong source of nosocomial infection because of the hand holding it comes in close contact with strongly contaminated body areas (mouth, nose, ears) [1]. Jeske et al [9], found similar results with mobile phones as with other fomites. Unlike most non-medical electronic equipment, there are no cleaning guidelines for mobile phones that meet hospital standards and the hygiene risk involved in their usage in the OT has not yet been determined. Cell phone manufacturers even warn explicitly against using cleaning agents. The use of protective covers may not be practical. Their use is questionable from the hygiene point of view.

Regarding certain social aspects, most mobile phones have extended functionality with camera and video recording capability. This has the potential to allow visitors to take inappropriate photographs and videos, thereby affecting patient dignity and privacy. Also, loud ring tones or music played on these phones often disturb critically ill patients and the constant chatter may be disruptive to other patients [2].

Anecdotal incidences are available of inadvertent unplugging of medical devices by patients or visitors for mobile charging, resulting in disastrous effects on the charging of monitors and defibrillators.

It is inescapable that mobile phones are a good tool for communication. Land lines in the hospital are usually kept free for the medical staff to receive and give information about critically ill patients and this limits the duration of calls. Due to the particular architecture of the ICUs, the reception of the cordless landline phones may not be good. Therefore it becomes more convenient for patients to receive/make calls with mobile phones which helps in removing the sense of isolation felt by the patients in the critical wards. Mobile phones also allow for quick exchange of information between the health care providers thereby helping in quicker implementation of decisions. A significant reduction in medical errors [10] and injuries [11] has been reported when phones replaced the conventional pager systems. This translates into better quality of patient care.

At present, the general recommendations are that there should be a relaxation of the restriction for the use of mobile phones. Even in high risk areas such as the ICU, OT or acute wards, it is relatively safe if kept

at a distance of more than three meters from electromedical equipments [1,10]. The extent of restriction is left to the local hospital authorities. Specific “mobile friendly zones” within a hospital where these phones can be used with impunity can be prominently displayed.

In service hospitals, along with the medical companies or the Corps of Electronics & Mechanical Engineers (EME), the medical stores should do an inventory analysis and a check on EMI transmission in existing systems. At the procurement level, it may prove beneficial to purchase those medical devices which comply with published electromedical standards [3].

Conflicts of Interest

None identified

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