**Short Communication**

**Death: a process or a point in time**

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Abstract

Death is an important event to the society and medical professionals. Its early recognition will enable those who are concerned to begin appropriate death related behavior. Though death and life can be mutually exclusive, it will be difficult to reject the concept of their co-existence in some form. The co-existence of life and death can make it conceivable to view death as a process.

**Keywords:** death, brain death, life support, somatic support

**Definition of death**

Since ancient times, man has pondered the mystery of his own death. Death definition remains heterogeneous. It is negatively charged by the absence of life. In the dictionary, it is defined as a permanent cessation of all vital functions or the end of life\(^{(1,2)}\). In the medical dictionary it is defined as the cessation of all vital functions of the body including the heartbeat, brain activity (including the brain stem), and breathing\(^{(3)}\). Thus, the definitions of death ultimately depend on the definition of life, upon which there is no consensus. In 1980, the Uniform Determination of Death Act states that: "An individual, who has sustained either irreversible cessation of circulatory and respiratory functions, or irreversible cessation of all functions of the entire brain, including the brain stem, is dead"\(^{(4)}\).

Death as a cessation of life is what is reflected by most linguistic and medical literature. Religious scriptures reflect on it as an active and precise process. In Jewish tradition, death is described as the going out of soul\(^{(5)}\). Christianity views death as the separation of the Immortal soul from the mortal body\(^{(6)}\). In Islam, the same concept is described, which is the departure of the soul from the body. What is interesting, in Islam is that when the soul departs it is followed by sight. This might reflect that the soul exits through the visual field.

**Fictional Medicine**

Though death is a naturally occurring phenomenon, its essence may be obscured\(^{(7)}\). To use the power of imagination to trace it, we need at least one solid fact. The concept of soul departure seems to be intuitive. To
capture the moment of death we might think of using special scanner with ability to detect the soul. Since we do not know the essence of the soul, the only place to capture it will be in fictional medicine.

**Death related behavior & rituals**

All humans, irrespective of their social, cultural and religious believe endorse certain death related behaviors. Many parties are interested in the exact moment of death in order to start their appropriate activities and rituals. We can broadly divide these behaviors into legal, socio-cultural and medical.

The legal behavior, mostly, is related to the socio-cultural issues. In few circumstances law is interested in knowing whether it is a criminal death or not. The socio-cultural behaviors are related to burial rituals, grieving, change in marital status, transfer of properties and religious rituals. The legitimate question is when to start death related behavior?

Advances in technology continue to create both opportunities but dilemmas at the same time. The development of expensive life sustaining measures created a big burden on the individuals and the society. One ICU day in US might cost 3000-6000 dollars. In Sudan it is estimated to be 800-3000 dollars. When someone is brain dead, we face ethical challenges. Continuing life sustaining measures is no longer life support, it is somatic support. Support can be continued for genuine reasons like organ transplantation. If that is not the case, then for how long should we continue such expensive care? We are bound with the ethical principle of justice which entitles fare distribution of limited resources. Can we pull the plug without family consent? The medical behavior becomes messy when we lack clear guidelines.

**Life and Death**

Life is clear, when you see it you know it, and does not require definition. At the same time when it is completely and clearly absent then we are dealing with death. Sometimes life and death are mutually exclusive. Occasionally, they can co-exist in some form. This will create the confusion of where to draw the boundaries.

Livings are distinguishable from the non-living chiefly because of action and reaction. A dead body does not show consciousness, think, display emotion, see, hear, breath by its own, maintain sustainable heart beats. On the other hand, science has demonstrated that the heart of a dead person can be kept beating and recording ECG. An excised and perfused kidney can produce urine. Aggressive laboratory measures can maintain the viability of the organs of a dead body. Reports have shown body tissues can be cultivated after death. Hypothermic patients can manifest all the criteria of death. If we resuscitate them aggressively, we can restore their previous function.

**Organs Interplay**

All body organs are important. When they lose function, they lose contribution. The consequences of their lost contribution depend on their primary function, how much is lost, ability of the body to compensate and available medical support.

With renal failure the body can go for years or decades with renal replacement therapy. In the absence of such measure, consequences of pulmonary edema, acidosis and hyperkalemia might shorten the life to weeks or days. The gut and liver might be viewed the same way. The body can sustain only few minutes without heart and lung functions. Support can maintain them for some time.

It is interesting to look at the interaction of the heart, lung and brain. The lung oxygenates the blood. The heart pumps the nutrient and oxygen to all organs. The brain cannot function without these constituents. At the same time the brain plays a major role in maintaining the integrity of other organs since it is the control station. If the heart and or the lung stop, the brain will stop in few minutes.
Consequently, if the brain is no longer functioning, then there will be no spontaneous breathing or sustainable heart function.

**Death**

It seems that, with our current tools, when we diagnose death it does not mean the death of all components and constituents of the body. We might view death as sequential event or staged process. The last part of it is a cellular death at which the body starts to disintegrate and putrefy. This might be preceded by organs death. This is the stage in which if we catch an organ with viability, we can use it for transplant. These two stages follow a point of reversible death, whether it is cardio-respiratory death or brain death. With the currently available methods and technology it is the only mean by which we can decide about irreversibility of death and we can no longer maintain or restore life as a whole.

In conclusion, I tend to believe the theological concept of death, that an essence or spirit departs the body irreversibly around certain time. At that time, life is no longer coming back. Since we are not able to detect this essence, we remain dealing with its consequences. First we detect physical death which refer to cardio respiratory or brain death, then organ death and finally cellular death. So death seems to be a process or staged activity. Departure of the soul could be a point in time or a process and it is beyond our measurement tools.

**References:**