

A REM Intrusion Model for Death Bed Visions: A Palliative Nursing Perspective

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ABSTRACT

Nurses often face the end of life conditions in resulting from several etiologies. It may be the end of life situations in chronic debilitating conditions like renal failures, oncological conditions and even progressive old age as such. Often around the clock nursing remains the primary mode of care for such patients. End of life care is complicated by several psychological and physical conditions. One of these psychological conditions which remain poorly understood is the presence of unusual end of life experiences where the exact role of nurses becomes controversial. In this article, we present a review of present literature on the end of life experiences. We will introduce by highlighting the importance of nursing position in observing these experiences. Subsequently, we will touch the neurobiological and psychological theories of near death experiences. We will then move towards the similarities between near death experiences and end of life dreams and visions. We will then elaborate on the REM intrusion model for near death experiences (NDEs). Finally, we will propound a REM intrusion model for end of life dreams and visions (ELDVs) and will see that the conditions of End of life predispose the patients for developing REM intrusions. Additionally, this model explains many of the features of ELDVs in both the phenomenological and neurological contexts.

Key Words: death bed visions, end of life dreams, end of life visions, near death experiences, REM intrusion, neurobiology

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Introduction ELDVs in the palliative nursing perspective

The role of nursing in end of life care is indispensable and mostly nursing staff remain the primary mode of care providing in the terminally ill individuals. End of life situations in chronic debilitating conditions like renal

failures, oncological conditions and even progressive old age as such. Often around the clock nursing remains the primary mode of care for such patients. End of life care is complicated by several psychological and physical conditions. One of these psychological conditions which remain poorly understood is the presence of unusual near-death experiences where the exact role of nurses becomes controversial. Thus the nursing care provider becomes the most evident observer of all the physical and psychological experiences of the patient. ELDVs are one of these integral components of end of life conditions which are frequented by the palliative nursing care provider. Death bed visions (DBVs) or the recently termed End of life Dreams and Visions (ELDVs) are common phenomena in

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individuals nearing death. The etiology and nature of this approach towards death may vary. However, there have been marked similarities between the reported experiences.

Not only do the nurses play the role of objective observers but also the patients confide these experiences with the nursing staff more than family members as observed by several studies. Study by Barbato et al (1999) found that patients & relatives tend to talk about DBP more to nurses than to doctors. In another pilot study by Brayne et al (2006), the palliative care team found that the patients confided their experiences to nurses more than the doctors. Also, the nursing team was able to observe that all staff felt DBP to be an intrinsic part of the dying process and that such experiences carried very personal meanings to the patients.

The nursing observation can be specifically contributory to the scientific literature of ELDVs because of two reasons: 1) Longitudinal data of the ELDVs can be obtained only from the individuals who are spending time with these patients over a prolonged course of time, 2) The nursing staff is the most common individuals observing the patients during the periods of their death. This observation can contribute several aspects of the associations between ELDVs and the subsequent nature of death, especially if the experiences are related to peaceful or stressful death.

Perhaps these are the reasons that some of the most commonly known facts about ELDVs have been actually based on nursing accounts. For example, a survey of hospice nurses stated that experiencing ELDVs are associated with calm and peaceful deaths (Lawrence & Repede, 2013). The findings of the current study are consistent with the previous studies that describe ELDVs as a source of comfort, peace, acceptance, and peaceful death (Betty 2006; Muthumana *et al.*, 2010; Lawrence & Repede, 2013).

However, the nursing contributions to the understanding of ELDVs have been mostly in the form of the reports of their observations. In this article, we extend our observations of ELDVs to a very actively researched area of similar nature- the near death experiences (NDEs). Here we extend our support to the dream theory of NDEs by drawing parallels between NDEs and the ELDVs. We show that most of the ELDVs could be actually some form

of dreams and that because NDEs and ELDVs share similarities, ELDVs could also be a form of dreams. Thus the REM intrusion hypothesis could be a better neurobiological model of NDEs as compared to the others.

Neurobiological Perspectives for Near Death Experiences

Many of the existent theories proposed to explain NDEs are based on neurobiology. We discuss some of these under the categories of natural opiates, ketamine, temporal lobe, altered blood gases, REM Intrusion, and ocular theories. To give the details of all these theories is out of context of present article. We will provide an overview of the same.

Most popular neurobiological theory of NDE has been the hypoxic theory of brain. The theory propounds that NDEs are a result of anoxia or hypoxia in the dying brain (Blackmore, 1983; Whinnery, 1997). Strong evidences from this theory comes from the study by Whinnery who was able to induce NDE experiences by creating brief periods of unconsciousness through rapid acceleration, which created an induced state of hypoxia. Other theorists suggested NDEs might be a result of hypercarbia, which occurs when levels of carbon dioxide are elevated (Morse *et al.*, 1989). Blackmore (1993) and Carr (1982) suggested that natural opiates released under extreme stress account for the feelings of peace and joy reported by many NDErs. The advantage of this theory was its ability to explain for phenomena such as a "life review" in which NDErs commonly report re-experiencing their past through vivid memories. According to Blackmore, excessive amounts of released endorphins cause temporal and limbic lobe seizures in areas affecting memory. Rogo (1984) suggested that NDEs may be a chemically-induced experience that occurs when ketamine is administered by clinicians as an anesthetic in emergency situations. Several researchers have suggested that the right temporal lobes may be involved with NDEs, because epileptics who have temporal lobe seizures report many phenomena similar to NDEs (Britton and Bootzin, 2004; Persinger, 1994; Saavedra-Aguilar and Gomez-Jeria, 1989). Stefansson et al (2006) suggested that visual sensations in NDEs are associated with different tissue pressures in the eyes and brain as a result of reduced arterial blood pressure during times of trauma or stress. According to this ocular



physiological theory, when arterial blood pressure drops, the eyes become ischemic and hypoxic, disturbing the retina and that may result in visual sensations reported by NDErs.

However, these theories have their own limitations for example, researchers pointed out that none of the participants in Whinnery's study reported experiencing a life review, OBEs, seeing non-physical beings, having a conversation with a being of light, along with reporting significant changes in spiritual or life values, which are all commonly reported by NDErs (Greyson, 2009; Parnia *et al.*, 2007; van Lommel *et al.*, 2001). Critics also noted that this induced experience also led to frightening hallucinations and agitation, which is not commonly reported by NDErs, who instead commonly report feelings of peace (Greyson, 2009). Similarly, Greyson (2009) pointed out that those with hypercarbia rarely report OBEs, a life review, seeing a bright light, or encounters with non-physical beings, and that many NDEs occur without increased carbon dioxide levels, which suggests hypercarbia is not necessary for NDEs to occur. Even the popular opioid theory is limited by the fact that endorphins and other opioids that are naturally released for pain control last for many hours, whereas the pleasant feelings experienced during NDEs are very brief in duration (Fenwick *et al.*, 2007; Greyson, 2009). Additionally, this theory has also failed to account for out-of-body experiences (OBEs) with reports of veridical perception where NDErs have accurately described resuscitation efforts that have allegedly been verified by medical staff (Greyson, 2009; 2010; Holden, 2009; Holden *et al.*, 2006). Similarly, Persinger pointed out that studies that have used transcranial magnetic stimulation of the temporal lobes to induce NDEs only vaguely resembled NDE phenomena and, when replicated, have failed to show consistent results.

Thus, the NDEs seem to be difficult for being explained by neurobiological theories alone. Thus we next turn towards psychological perspectives for the same.

Psychological Perspectives for Near Death Experiences

In addition to the neurobiological theories, there are a number of psychosocial theories used to explain NDEs. These include depersonalization, personality factors,

attribution, expectation, and birth (or perinatal) theories. The depersonalization theories have been the most discussed among them. These theories propound that NDEs occur as a form of detachment that occurs as a psychological defence against the fear of death (Noyes and Kletti, 1977). However, this theory has had some serious opposition in from several angles (Brumm, 2006; Duffy and Olson, 2007; Holden *et al.*, 2006). Personality Factors are another well studied psychological group of constructs in the context of NDEs. Gabbard and Twemlow (1984) proposed that NDEs are more likely to occur in individuals who have personality characteristics prone to dissociation, absorption, or fantasy proneness-, characteristics which make it more likely to experience a NDE under states of stress or trauma. However, studies have shown contradictory results and do not reveal significant relationships between the NDE and absorption or fantasy-proneness personality traits (Britton and Bootzin, 2004; Brumm, 2006; Greyson, 2003; Simpson, 2001; Wren-Lewis, 2004).

Norton (1995) suggested that how individuals interpret NDEs are a result of how they make sense out of and simplify the experience, as well as resolve ambiguities associated with it. Accordingly, this subjective interpretation of the meaning and cause of their NDEs results in various attributions or descriptions about what the NDE is. However, Greyson (2009) pointed out that this theory fails to take into account why there appears to be universal themes consistently reported by NDErs, although it may be useful in explaining how each individual subjectively interprets and finds meaning in their experience. Expectation related theories in this context have also been propounded in this context. These theories have been mainly put forward by Rodin. Rodin (1980; 1989) proposed an expectation theory that NDEs are a psychological response to the fear of death, which culminates from social and cultural expectations. According to Rodin, NDEs are simply products of one's imagination designed to protect oneself from the fear of death and are experienced differently by different cultures. However, subsequent research does not support this hypothesis, since a growing body of research has revealed cross-cultural similarities of NDE reports (Greyson, 2009; McClennon, 2006a; 2006b; 2005; Ring, 1984; 2000).



ELDV and NDEs: How similar and how different?

Although literature suggests that ELDVs and NDEs are two distinct phenomena, there is not a clear line of demarcation between the two. Definitely, these states share some common features which makes them interrelated:

1) Both of them are related to end of life conditions. Regarding NDEs, it is well known that they occur in instances of close brush with death. Most research indicates that ELDVs occur in close proximity to death with the time frame ranging from hours, days, weeks, or even months prior to death (Fenwick & Brayne 2011; Muthumana *et al.*, 2010; Lawrence & Repede 2013; Ethier, 2005).

2) Both of them consist of visuo-auditory experiences. These experiences may involve visual, auditory, and/or kinesthetic experiences (Lawrence & Repede, 2013) with visions occurring during a wakeful state or dreams occurring during sleep.

3) The themes of both these experiences are strikingly similar (Visions of deceased, light). The content of ELDVs are varied and often include previously dead family members, pets, or currently dying individuals in the family (Fenwick & Brayne, 2011; Ethier, 2005; Mazzarino-Willett, 2010).

4) Both experiences reportedly result in development of a spiritual experiences, different outlook towards death etc. ELDVs may be spiritually transforming, as patients have described dead loved ones as messengers guiding them on their journey through death (Ethier, 2005),

These similarities are of particular concern for present discussion because the underlying aetiology would be similar in both of these experiences.

The REM Intrusion Hypothesis of NDEs

The purpose of dreams in biological as well as psychological contexts remain speculative. Theories of dreams include psychological, neurobiological and spiritual domains as well.

Before we move to next sections, it is important to understand what exactly do we mean by REM intrusion? Sometimes they go into REM sleep before even falling asleep. In these cases, patients experience visual hallucinations because they start dreaming

while they are still awake. This is called REM intrusion phenomena. Typically, patients with Narcolepsy experience REM intrusions when they are in bed ready to fall asleep, or when they wake up. In addition, patients may feel their bodies paralyzed as they start to fall asleep or as they wake up. This is called sleep paralysis. REM intrusions and sleep paralysis frequently occur at the same time which makes the experience fairly scary. Recently, Orexin-1 and 2 receptor antagonism has been implicated in REM intrusion (Dugovic *et al.*, 2014).

There are three lines of evidences providing support to the REM intrusion as a mechanism for NDE generation. We will discuss these evidences here. First of all, we will discuss how latest studies indicate that individuals experiencing NDEs have a predisposition for experiencing REM phase intrusion. Next we will address the similarities between the phenomenological experiences of NDE and REM sleep intrusion phenomena. Finally, we will see how the predisposing conditions of NDE, which are actually the conditions of extreme stress can also precipitate REM sleep intrusion phenomena.

Predisposition of NDEs for REM intrusion phenomena

Recently, it has been pointed out that individual experiencing NDEs are actually predisposed to having REM intrusion phenomena. Much of the evidence for this hypothesis comes from the landmark study by Nelson and colleagues (2006). They examined the lifetime prevalence of REM intrusion in 55 NDErs and found that sleep paralysis and sleep-related auditory and visual hallucinations were common in NDErs, as well as was REM intrusion during wakefulness. They suggested that cardiac arrest can evoke REM intrusion, explaining NDEs. They also found that most of the subjects experiencing NDEs also reported to past experiences of hypnagogic and hypnopompic hallucinations as well as cataplexy. However, Greyson (2009) question their conclusion pointing out that it is not known whether REM intrusion contributed to the NDEs or was a result of the NDEs.

Several of NDE related phenomenology is similar to those observed in REM

One of the most important pieces of evidence that make the REM-sleep-model appealing for



NDEs is the striking similarity between the subjective experiences of these two conditions (Cheyne *et al.*, 1999; Nelson *et al.*, 2006). Perhaps this is the reason that Hypnogogic and hypnopompic experiences (HHEs) the common features of the REM sleep abnormality –the sleep paralysis (SP) are often cited as sources of accounts of supernatural nocturnal assaults and paranormal experiences. Cheyne et al (1999) teased out two factors in these experiences which (theoretically) produce the experiences of an implied alien “other” consistent with occult narratives identified in numerous contemporary and historical cultures. They also found that, these two factors have in common an a third factor, named as *unusual bodily experiences*, consisting of floating/flying sensations, out-of-body experiences, and feelings of bliss which are all very similar to those experienced in NDEs. This third factor which is a complex of physically impossible experiences is quite similar to the NDEs experiences. However these experiences have been hypothesized to be generated by conflicts of endogenous and exogenous activation related to body position, orientation, and movement (Cheyne *et al.*, 1999).

Another important study by Ohayon (2000) reported of sleep-related sensations possessing phenomenological characteristics similar to those observed in NDE, such as falling into an abyss and the sensed presence of an entity observed in 16% and 9% of normal people respectively.

Autoscopy is another one of such experiences which deserves a special mention here. This feature which is typical of NDE which has also been observed in dreams of REM sleep (LaBerge *et al.*, 1988). More importantly, REM sleep disorders like Narcolepsy often present with features of autoscopy (Mahowald & Schenck, 1992; Overeem *et al.*, 2001). Additionally, autoscopy can occur with a sense of danger alone (Noyes & Kletti 1976) and has definite neurobiological basis. For example, in epileptic patients, autoscopy was reported in 6% and independent of seizure type (Devinsky *et al.*, 1989). The intriguing recall of autoscopy during generalized tonic-clonic seizures (Devinsky *et al.*, 1989; Sabom, 1982) may have parallel with autoscopy during NDE from cardiac arrest.

The often-cited “light” of NDE could have specific reasons as well. These visions could be based on visual activity promoted by

REM mechanisms during retinal ischemia. It has been observed that with hypotensive syncope, tunnel like peripheral to central visual loss develops over 5 to 8 seconds, while other cortical functions remain intact (McCarley *et al.*, 1983). In another study, Lambert and Wood confirmed retinal ischemia as the origin of syncopal blackout by preserving both vision and retinal perfusion using vacuum goggles to decrease intraocular pressure during arterial hypotension (Lambert and Wood, 1946).

Finally, the feelings of rapture, peace, or euphoria which often present with NDE (Morse *et al.*, 1986) are also observed in REM sleep. In fact, this similarity has received considerable attention because of the underlying neurobiological mechanisms, especially the involvement of reward pathways. The pedunculo pontine and latero dorsal tegmental nucleus (PPT/LDT) is considered instrumental in promoting reward behaviour (Yeomans *et al.*, 1993) with fibers projecting to the ventral tegmental region (Oakman *et al.*, 1995). The limbic and paralimbic regions active in REM sleep are also important in the reward system (Nofzinger *et al.*, 1997). These reward pathways are especially important in NDEs because they are also observed in association with the pleasant or positive feelings found with syncope (Lampert *et al.*, 1994).

There are also distinct lines of evidences showing that REM phase can be precipitated in predisposing conditions of NDES

These evidences show that REM intrusion can occur in conditions of extreme physical stress. Thus this line of evidence shows that REM intrusion is common in near-death conditions where NDEs are more probable to occur:

- 1) Both REM phase–on and REM phase–off neuronal discharges can be recorded from many neurons within the lateral PBN, including some that are tightly phase locked (Saito *et al.*, 1977). Although not well characterized, REM-generating regions are known to respond to hypoxia. Cholinergic neurons within the PPT increase their firing rate, (Plowey *et al.*, 2002) and *c-fos* activity increases in the LDT (Bodeneau *et al.*, 2001).
- 2) The usual stress response, often termed as the “fight-or-flight” response as a



reaction to sensing danger often requires the arousal system to be tightly coupled with central nervous control of the cardiorespiratory systems. Afferent fibers from stretch, pressure, mechanical, and chemoreceptors transmit sensory information from the heart, vascular, and pulmonary systems to the brainstem principally by the vagus nerve along with glossopharyngeal and trigeminal nerves. At the same time, it has been observed that vagal afferents robustly promote REM intrusion. Even the electrical stimulation of the vagus nerve enhances REM (Puizillout & Foutz, 1976; Valdes-Cruz *et al.*, 2002; Fernandez-Guardiola *et al.*, 1999), elicits parieto-occipital geniculate (PGO) waves (Valdes-Cruz *et al.*, 2002; Fernandez-Guardiola *et al.*, 1999) and causes atonia in various animal preparations (Valdes-Cruz *et al.*, 2002; Puizillout Foutz *et al.*, 1977). This phenomena of transition from wakefulness to REM sleep has been termed variously as “reflex REM narcolepsy” and “narcoleptic reflex” (Valdes-Cruz *et al.*, 2002).

However, we suggest that because of repeatedly being involved in dreaming, the patients develop a sense or ability to control their dreams and make it more pleasurable. The content of dream depends on what they already know and not something supernatural or spiritual.

The REM Intrusion Model of Death Bed Visions

In this section, we will focus on the theme of this article. Here we will propose that several aspects of the DBVs can be explained by the REM intrusion model. In fact, as we will progress through the sections, we will observe that the REM intrusion model is more applicable to DBVs than NDEs. Dreams are commonly experienced in patients in their terminal phases of life. In fact, this is the reason that the death bed visions have been termed as end of life dreams and visions. So dreams are integral to such experiences. Thus it seems that all of these experiences are in fact dreams of varying nature.

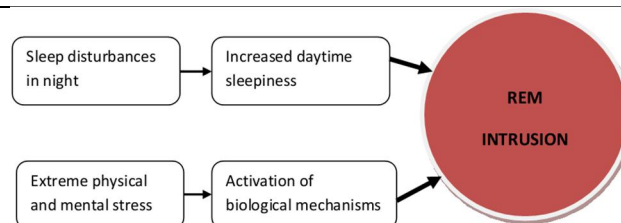


Figure 1. Two different mechanisms of predisposition of end of life conditions for experiencing REM intrusions in day time.

We will cover this section under two parts. In the first part, we will see that such terminally ill patients are actually much more predisposed for developing daytime sleepiness and narcolepsy like features which include REM intrusions. In the second part, we will see that the REM model is a plausible substrate for explaining the REM intrusions in end of life conditions. Thus we will argue that this model is the suitable one for explaining the dreams and visions in end of life conditions.

1) Predisposition of terminally ill patients for REM intrusions: In this section, we will observe that There are some predispositions, specifically observed by the nursing care taker which make the REM intrusion model of DBVs especially more appealing in such patients:

a. Sleep disturbances and day-time sleepiness are common in terminally ill patients

Sleep disturbances are well known in terminally ill patients. Especially insomnia is commonly found in hospice patients. In fact, in the study by Hugel et al (2004), 70% of the hospice patients had insomnia symptoms. This group of patients is prone to develop insomnia for several reasons including sleep interruptions, physical ailments and several psychiatric problems which all affect the quantity as well as the quality of the sleep.

This insomnia predisposes the individuals to have daytime sleepiness as well as to narcolepsy, although both these conditions are the parts of same spectrum. Increased day time sleepiness has been well reported in patients in terminally ill patients (Vena *et al.*, 2006). Also, insomnia is a common accompaniment of narcolepsy. It is best characterized as a difficulty to maintain nighttime sleep. Typically, narcoleptic patients fall asleep easily, only to wake up after a short nap



and unable to fall asleep again for an hour or so. Narcoleptic patients do not usually sleep more than normal individuals over the 24-hour cycle but frequently have a much disrupted nighttime sleep (Hishikawa *et al.*, 1976; Broughton *et al.*, 1988; Montplaisir *et al.*, 1978). This pattern of sleep is common in patients facing end-of-life conditions in various hospices.

b. Continuous physical and psychological stress predisposes such patients for REM intrusion

Mostly the patients referred for the hospice care are the terminally ill patients. Usually several physical symptoms are present in such patients. For example, pain, were the commonest cause of insomnia, cited by 60% sleep-disturbed patients in the study by Hugel *et al* (2004). As explained in the previous section, such patients who are exposed to stress are actually more prone to develop REM intrusions by various biological mechanisms including the vagus nerve mediated enhancement of REM.

2) Plausibility of the REM intrusion model for ELDVs

Here we will elucidate that the REM intrusion model is quite plausible for explaining the features of ELDVs. For this purpose, we will take the vantage points from two separate perspectives:

The Phenomenological Perspective

Phenomenological, *death bed visions* share some important similarities with REM sleep, especially the experience of 'waking reality'. For example, Kerr *et al* (2014) patient's pre-death dreams were frequently so intense that the dream carried into wakefulness and they often experienced them as 'waking reality'. They found that Regardless of whether the experience occurred during waking (19%) or sleep states (46%) or both (35%), the dreams/visions conveyed a sense of realism. We opine that this aspect of the dream experienced as the waking reality could actually be the hypnopompic hallucinations observed in REM intrusion phenomena. In addition, despite very little spoken dialogue within the dreams/visions, the circumstances and significance of the experiences were still conveyed. The predominant quality of pre-death dreams/ visions was a sense of personal

meaning, which frequently carried emotional significance for the patient. This was also true of ELDV's that were not comforting.

The realism of pre-death dreams/visions is consistent with prior research suggesting that during stages of transition or crisis, dreams become more vivid, intense and memorable (Barret, 1996). This sense of crisis and stress is one of the common features of persons in the end of life situations.

The Neurobiological Perspective

After the phenomenological perspective, we turn towards the neurobiological plausibility of REM intrusion model. Unfortunately, unlike near death experiences as such, there are no brain-related studies for exploring ELDVs. Obviously performing EEG and fMRI are out to question in these populations just for sake of obtaining neurological correlates of these experiences. We thus opt an exclusion principle, whereby we will try to show that all other neurobiological theories of NDEs are not applicable in this condition. In fact, only REM intrusion by stress induced neural responses makes some sense here.

The most common theory of NDEs has been the hypoxia theory in response to falling cerebral blood flow (Van Lommel *et al.*, 2001). Most powerful evidence for this theory comes from the induced hypoxia experiment by Whinnery (1997). However, this theory lacks credibility for explaining ELDVs for two important reasons. First of all, the level of hypoxia expected to produce NDEs can never be achieved in ELDVs as this amount would be fatal for the patient. Secondly, the type of experiences in these studies have been in the form of tunnels and fragmented visions without a sense of realism and meaning instead of a well formed vision with profound meaning which is the characteristic of ELDVs. In fact, in the landmark study by Whinnery (1997), frightening hallucinations and agitation was observed which is rarely seen in ELDVs as mentioned before. Similarly, the OBEs are rarely seen in the hypercarbia induced NDEs (Greyson, 2009), eye blood pressure fall due to stress (Stefansson *et al.*, 2006) and LSD experiences (Bresloff, 2002) where the predominant experiences are that of visual geometric figures and fleeting hallucinations and without and serious meaning. The ketamine related experiences are actually very similar to that observed in ELDVs. However, as



Greyson (2009) pointed out, there is no internally formed chemical similar to Ketamine. So this theory is not applicable to the experiences occurring due to natural reasons. Finally, the opiate-response-to-stress theory also fails to account for the ELDVs because as Fenwick (2007) pointed out, the opiate response to pain last for many hours but the experiences last only seconds to minutes. Also, this theory has been limited to mainly explaining tunnel visions and lights and cannot account for the OBEs. In addition, from the nursing perspective, we can see that the stress experienced by end of life patients is chronic rather than acute. Thus opioid induced reaction would have to last longer instead of the ELDVs which are mostly for few minutes,

Thus, after excluding all these theories, only the REM-intrusion based neurobiological theory seems applicable. According to this model, afferent fibers from stretch, pressure, mechanical, and chemoreceptors transmit sensory information from the heart, vascular, and pulmonary systems to the brainstem principally by the vagus nerve along with glossopharyngeal and trigeminal nerves. Activation of these vagal afferents robustly promotes REM intrusion. Even the electrical stimulation of the vagus nerve enhances REM (Puizillout & Foutz, 1976; Valdes-Cruz *et al.*, 2002; Fernandez-Guardiola *et al.*, 1999) and elicits PGO waves which are most prominent in REM sleep (Valdes-Cruz *et al.*, 2002; Fernandez-Guardiola *et al.*, 1999).

However, because of the paucity of the data correlating any neurological functions directly with ELDVs, this model cannot be overemphasized and many more serious researches are required from the neurobiological front.

Conclusion

The ELDVs remain one of the most mysterious aspects of end of life conditions. The scientific literature in this context remains scarce. Among the theories available for NDEs, the REM intrusion model is the most applicable. The patients in end of life situations are prone for developing REM intrusions and this model explains several aspects of ELDVs phenomenologically as well as neurobiologically. More well conducted researches are warranted in this field.

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