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Consciousness During Cardiac Death: A Window to Improving Brain Resuscitation?

ReachMD would like to wish you a happy and healthy New Year and with each New Year comes a fresh start. As we look ahead ReachMD is proud to present this month's special series, Focus on Future Medicine.

Does the mind exist after there is no brain function. You are listening to ReachMD, The Channel for Medical Professionals and today we have a special segment on the future of medicine. I am your host, Dr. Maurice Pickard and today our special guest is Dr. Sam Parnia. Dr. Parnia is a Fellow in Pulmonary and Critical Care Medicine at Weill Cornell Medical Center New York, New York and he is also an Honorary Senior Research Fellow at The University of Southampton, The United Kingdom, School of Medicine.

### DR. MAURICE PICKARD:

Thank you very much for joining us.

### DR. SAM PARNIA:

Thank you, it is a pleasure to be with you.

### DR. MAURICE PICKARD:

To begin with, could you explain, AWARE, which is an acronym for awareness during resuscitation.

### DR. SAM PARNIA:

Yes this is the study that has just been launched through The University of South Hampton in the UK and it is currently the world's largest ever study looking at what happens to the human mind and brain during clinical death and cardiac arrest. The reason why it was set up because there have been a number of small studies that have shown that, consistently demonstrated that at least 10% to 20% of people who have gone through a cardiac arrest and had been brought back to life, will report some activity of their mind during consciousness, and interestingly other studies have shown that if you look at the brain during cardiac arrest (01:30) because there is a lack of blood flow even during advanced life support measures that there is no measurable brain activity yet somehow consciousness appears to be continuing and therefore we wanted to set this study up to see what people experienced during those initial periods of death, what death is like, and also whether consciousness does indeed continue. The primary thing that we will be testing is the relationship of the brain with the ability of people to hear and see things accurately. As you may know, some people claim to have been

able to watch doctors and nurses working on them from a point above.

**DR. MAURICE PICKARD:**

Could you also tell me what is the human consciousness project. Is this the overseeing group?

**DR. SAM PARNIA:**

Yes the human consciousness project is a multidisciplinary collaboration of scientists, physicians, and academics with an interest in studying the mind of consciousness and its relationship with the brain and it was formed at The University of Southampton again in the UK and the AWARE study is one of the studies that has been developed through this group.

**DR. MAURICE PICKARD:**

Well what is the method, how do you study this?

**DR. SAM PARNIA:**

There are 2 major components to this, one is studying objectively what happens to the brain during cardiac arrest in individual people because although we know there have been studies in humans and animals, it has been shown that there is no measurable brain activity because there is a lack of blood flow. We want to determine whether in each individual person who does have memories and consciousness, what was happening in that specific case, so we will be using sophisticated brain-monitoring technology called InVoss which measures oxygenation within the brain. It is a noninvasive measure (03:00) and it gives us an indication of blood flow through the brain when someone is going through a cardiac arrest and they are being resuscitated and then we will be correlating that as well as other physiological parameters like oxygen levels, carbon dioxide levels, drugs that patients were given during the period of cardiac arrest with what they recall that happened to them. Now a lot of what people recall is very subjective. So they will for example describe seeing a tunnel, seeing a light, feeling very peaceful, maybe describe even a sensation of seeing deceased relatives or going to a very beautiful place, the so-called near-death experience, which although it is interesting it cannot be validated scientifically, it is just a phenomenon that happens. There are some people though who claim to have had a sensation of separating from themselves, going through ceiling and supposedly they describe being able to see doctors and nurses working on them in accurate detail and that is a component that we can test objectively by placing images that are only visible from certain areas in the rooms. For example, some of the images can only be seen if you are really looking down from the ceiling and from no where else. The idea is simple, if we get 300 or 400 people, who will claim to have been able to see doctors and nurses working on them if none of them can see those pictures that were only visible from the ceiling, this would suggest that these claims of consciousness and the ability to see may just simply be an illusion or a false memory. If on the other hand, they will accurately describe them, then it would suggest that consciousness can be nonlocalized to the brain, which of course is possible because the mind really is a mystery that we don't quite understand.

**DR. MAURICE PICKARD:**

So these are images that are moved into the (04:30) cardiac care area during the cardiac arrest?

**DR. SAM PARNIA:**

In most cases, the areas are actually pre-installed with images. So before we start the study, we will place images at a particular height that makes it such that you cannot see them from the ground level up. So for example lets 6 feet 5 from the ground level. And they are positioned such that they are only visible if you are looking from the ceiling and then essentially everything else runs as normal. You know, when there is a cardiac arrest and the person survives, we then interview them, get consent and then find out what they experienced and did they see the pictures or not.

**DR. MAURICE PICKARD:**

So during a cardiac arrest, the patients are also being ventilated, you are measuring their cardiac output, you are measuring their CO2 whether it is rising. You are measuring their oxygen saturation, what other things are you measuring to make sure that these parameters are not influencing the perceptions?

**DR. SAM PARNIA:**

Well with the things that we are specifically looking at as I mentioned, as you just pointed out, carbon dioxide levels, oxygen levels, the drugs that people were given, we will make a list of those and the reason why we are looking at those is because people have suggested that these experiences maybe related to oxygen levels for example and then obviously that will be correlated with an objective measure of cerebral oxygenation using this Invoss technology and then the other things that we will be looking to test in some cases where possible will be specific markers of brain injury. There are specific biochemical markers that could be tested, things like neuro-specific enolase that gets released if there is injury to the brain and that will determine how much injury had taken place during the cardiac arrest. (06:00)

**DR. MAURICE PICKARD:**

So what you are really saying is that consciousness and the mind can be separated from brain function?

**DR. SAM PARNIA:**

Well at least brain function that we know. I mean one of the things that we have to appreciate is that, right now scientifically speaking, we have no idea about the nature of the mind or consciousness, you know. We all know that we are thinking beings. We know that mind and consciousness exists, what we don't know how it relates to brain activity. For example, is it really related to electrochemical activity of the brain, we simply don't know. We know that there is definitely a correlation such that as electrical activity of the brain goes down and eventually ceases, there should be no activity of consciousness, at least nothing that we can measure, yet paradoxically and although that was certainly true, paradoxically when we study the mind and consciousness during arrest, it appears that even if there is no measurable activity of the brain, somehow people are able to be fully conscious and able to see, hear whole memories, have lucid, you know, well structured thought processes just like anyone else and of course if that is confirmed through the AWARE study, that will be a very big discovery.

**DR. MAURICE PICKARD:**

If you are just joining us, you are listening to a special segment on the future of medicine on ReachMD, The Channel for Medical Professionals. I am Dr. Maurice Pickard and I am speaking with Dr. Sam Parnia. Dr. Parnia is a Fellow in Pulmonary and Critical Care Medicine at the Weill Cornell Medical Center New York, New York and we are discussing his research on near-death experiences.

Do you think after having said this to me, **(07:30)** that this is going to change how we take care of people going through the dying process?

**DR. SAM PARNIA:**

I think this is one of those studies or this type of work I should say will have huge implications for many aspects of our care. One of them is simply being able to on a very sort of simplistic level being able to tell people and explain to them what death is really like and what they will experience because a lot of people are very much afraid of this when they come to the end. Another component, which will benefit our care is really trying to determine ways that we can improve resuscitation of the brain during cardiac arrest because so far all the measures that we have during cardiac arrest essentially rely on looking at a beating heart or electrical activity of the heart and possibly a pulse that we can measure with our fingers, which doesn't tell us anything about what is happening to the brain. So one of the important things is to try to improve our measures of what's really happening in real-time to the brain. The other implication that this has is really trying to understand more about death because 100 years ago when somebody's heart stopped that would be the end of it. There was nothing that you could do much about it. Today what we realized actually is that death is not a moment, there isn't a line that you can draw and say well after this point, the person is dead and before that, they were alive. We define death when there is no heartbeat, there is no pulse, and there is no measurable brain activity when we look for the pupillary responses that are absent, but of course there are still cellular processes going on after that point has been reached, you know, at what point does the human mind and consciousness cease activity after we have died. Is it **(09:00)** the first few seconds, is it first few minutes, is it 10s of minutes and we simply don't know and where this will become significant of course is in areas that are currently medical ethical issues like say transplantation. At what point do we really define somebody as dead, dead enough to remove their organs. Is it immediate when their heart stops, well may be not. May be we have to give it a period of time, is it 5 minutes to 10 minutes and this is one of the questions that actually is going on right now in medicine and we don't have answers for.

**DR. MAURICE PICKARD:**

Functional MRIs shows that, you ask a patient a particular question and a metabolic process takes place in a certain area in the brain that can be reproduced, but this is a metabolic process. Is there some relationship between that metabolic process and the subjective feeling of consciousness. Is this metabolic process really the same thing that goes on when people have perceptions?

**DR. SAM PARNIA:**

Well you raised a very interesting point and that is that does metabolic activity in the brain somehow define thoughts because if you think about it, I mean we can study different levels of consciousness, different thought processes, different aspects of the mind and study it during, you know, using a functional MRI scan and we can then determine when someone for example is feeling sad, which areas of the brain have changes in blood flow or if you are using a PET scan, you can look at changes in glucose uptake within those areas of the brain and therefore determine that there is more or less activity in specific components, but the big question really for science is **(10:30)** how does that tell us what thoughts are, you know, and how can we determine how thoughts arise from brain activity. For example, why would a bit of electricity coming across a synapse or oxygen uptake or glucose uptake lead to the generation of this amazing phenomena of thought and that is really the crux of the problem in science, that is the problem of consciousness. No one understands how thoughts arise. We know that they correlate with different activities in different parts of the brain, but we don't know if they are close by that, and that I don't think we have an answer for yet, although studies that we are carrying out maybe able to help answer these questions in the near future.

**DR. MAURICE PICKARD:**

Earlier in the interview, you described perceptions and that there are many similarities, light, warmth, going down a tunnel, but let me ask you about the 10% to 15% of people who have these perceptions, are they different than the other people who don't have them?

**DR. SAM PARNIA:**

At this point, there is no indication that they are particularly different, this is a phenomenon that has been described all over the world, different age groups and certainly in the studies that have been carried out during cardiac arrest, which are much more controlled, there seems to be no major difference. For example, people are given the same medication because they were resuscitated in the same protocol. There may be some evidence generated, but it is very, very small and I am not sure how accurate it will turn out to be, that maybe that somehow people are wired in such a way that they can recall these better. You can compare this with say the phenomena of dreams, you know. Why do that we all dream, but we recall only a small proportion of them, and why do some people recall more of their dreams than others. **(12:00)** May be their brain is wired in such a way that they can recall their memories better and so maybe during cardiac arrest more people or even everyone might have these experiences, but somehow only 10 to 15% or 20% are wired such that they can actually recall them afterwards as well.

**DR. MAURICE PICKARD:**

I was thinking of their religious background, their feelings of afterlife and even how they are brought up in a particular culture.

**DR. SAM PARNIA:**

There is no evidence if there is any relationship with their religious background or their culture as such and by that I mean that people from all different backgrounds will have had these and will have these experiences, even people who are atheist. What you do find though is that the interpretation of the experience does to some extent depend on the individuals. So for example, if a Christian say in the US and a Hindu in India both have one of these experiences and even if they see a light or a being of light, the Christian may describe seeing Jesus, the Hindu may describe seeing Krishna, but nevertheless they have both seen the light. Or if a child has one of these experiences, the way they interpret it or the way they describe it is in the child's sort of terminology or vocabulary. So for example a small child that I interviewed who was less than 3 when he had the experience, had described seeing a bright lamp rather than a light. You know that is the way that he could describe it to his parents. So the interpretation depends on the individual, but the core features seem to be similar.

**DR. MAURICE PICKARD:**

I know you are expanding your project to the United States, if there are areas or hospitals, intensive care units that want to contact you to become part of the project, how **(13:30)** should they do this.

**DR. SAM PARNIA:**

The best thing is if they could just e-mail me or if they could actually go to one of our web sites which is, [www.horizonresearch.org](http://www.horizonresearch.org). They can just e-mail through that web site and it will come to me. It also has information on the study.

**DR. MAURICE PICKARD:**

I want to thank Dr. Sam Parnia, who has been with us today and we have been discussing AWARE, which is awareness during resuscitation, these near-death experiences is certainly changing the way we look at dying and the whole dying process and how we may even treat our patients. As Stephen Hawkins has said "real science can be stranger than science fiction and much more satisfying".

I am your host, Dr. Maurice Pickard, and you have been listening to a Special Segment on the future medicine from ReachMD, The Channel for Medical Professionals. Please visit our web site at [ReachMD.com](https://ReachMD.com), which features our entire library through on-demand podcasts or call us toll-free with your comments and suggestions at 888-639-6157. Thank you for listening.

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