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Delivering the Best Outcome in Critical Care

ASSOCIATION BETWEEN CRITICAL CARE MANAGEMENT AND PATIENT MORTALITY IN INTENSIVE CARE UNIT

Your patient is not getting well in spite of your good care. You send him to the ICU because you know that is going to have the best outcome. Now who do you think is going to deliver the best care, the critical care doctor or the doctor who is not a specialist? You could be wrong.

You are listening to ReachMD XM157, The Channel For Medical Professionals. Welcome to the Clinicians Roundtable. I am Dr. Shira Johnson, your host and with me today is Dr. Mitchell Levy from Brown University in Providence, Rhode Island. Dr. Levy is the Professor Of Medicine at Brown Medical School and he is Medical Director of the Medical Intensive Care Unit and Director Of Critical Care Services at Rhode Island Hospital in Providence. He is a fellow of the American College of Critical Care Medicine and the American College of Chest Physicians. He has a done a lot of research in the ICU arena and he is going to talk about some of that today. Today, we are discussing the associations between critical care management and patient mortality in the Intensive Care Unit.

DR. SHIRA JOHNSON:

We are very glad you could take the time from your busy schedule to be here, Dr. Levy.

DR. LEVY:

It is a pleasure, Shira.

DR. SHIRA JOHNSON:

So first of all, tell us about your study. What was the background and what was the objective?

DR. LEVY:

Well, this study was initially conducted as part of a rationing study. We had a group task force what is called VERIC, which is Values, Ethics, and Rationing in Critical Care and we were trying to determine the impact of various interventions on outcomes in critically all patients. So, we wanted to look at nurse patient ratio and other things and so we took the project impact database and project impact is a large database that was originally established by the Society of Critical Care Medicine in an attempt to be able to look at research utilization and functioning in each Intensive Care Unit and then compared them across the United States. So, we took the project impact

database from 1996 to 2000 and there were almost at 200 variables in the project impact database. Some of them are hospital level, some of them are Intensive Care Unit level, some of them are patient level variables like age and blood pressure, etc. etc. and we tried to look at what variables had a significant impact on outcomes. So, 20 of those variables had a significant impact and one of them was whether or not the patients were managed the whole time by critical care physicians in the Intensive Care Unit.

DR. SHIRA JOHNSON:

How did you determine the amount of time that were actually managed by critical care physicians because that seems kind of hard to track.

DR. LEVY:

Yes, that is a crucial question because obviously the critical care physician can take care of them as soon as they walk in the door of the ICU or in the middle or just at the very end when they are already dying. So, we have to adjust our analysis for that. The variable in the project impact database, which is recorded by the nurse at each institution and they receive training on how to record this. So, the quality of the data that project impact receives is pretty good and standarized through a series of CT-based training sessions leading to a sort of exam for each of these data collectors at each institution and they determine a couple of things. They determine was the patient managed by a critical care boarded or board eligible physician and if so were they managed the whole time or were they managed part of the time or were they managed never. So, those are the three levels variables. Because we cannot find out if it is some of the time whether that some of the time was on the first day or the second day or the last day, we actually took all those patients out of the analysis. So, the only patients we analyzed in the study were the patients who either received critical care management the whole time there in the ICU or never.

DR. SHIRA JOHNSON:

And our audience is probably breathless what did you find? What is the unexpected findings from the study.

DR. LEVY:

Well, I am an intensivist by trade, so I was about to say unfortunately, but the results of the study were really contour intuitive to both what we think and what has been shown in the literature and that is that patients who are managed the entire time by critical care physicians while there in the ICU actually had a higher odd ratio for mortality and that odd ratio was independent of the level of severity and was also present across several subgroups that we looked at. For instance, the patients who came in on a ventilator, the patients who came in on shock, the patients who had an infection, etc. etc. and so it was extremely surprising to find these results and certainly accounted to what I had anticipated.

DR. SHIRA JOHNSON:

Now, what some of your theories that could possibly explain some of these results? Give us a few of them.

DR. LEVY:

Probably, you could imagine there has been a tremendous amount of debate and discussion since this came out because I myself thought this was an opportunity to prove in a 100,000 patients, which was the size of our sample that we in critical care doctors improve the outcomes that we spoke of.

DR. SHIRA JOHNSON:

Well, advanced training, advanced practice state of the art care, we are going to do better if better can be done.

DR. LEVY:

So, it really does force us to look at a couple of things first. I think we have to look at the weaknesses of the study. We were comparing patients who are cared for in smaller community hospital in which there was no critical care management available, none at all. With hospitals that are larger or middle sized where only critical care management was available. So, already you see very different patient populations being compared and the way we compared it was by adjusting for severity and we used and expanded SAP 2 score, which was a very common method for adjusting for severity. Now, we think we did everything we could to match these patients and adjust for severity, but no severity adjustment is perfect. So, it is possible that there were some, what we call residual confounders, that makes one patient more severe than another, but has not really picked up by a severity score. So, I think it is important to start off by saying that there is a very strong inherent weakness in all the data. Having said that I also think is science is <_____>. So, we found that mortality was higher in these folks managed by critical care physician. So, this field has to take a step back and say why could that be and I think there are several possible explanations. First it is just possible that critical care doctor do more procedures, over test, over invade, and it is possible that in some selected population of critical care patients, they actually do worse because of its harm and I think we have to at least put that on the table and think about it.

DR. SHIRA JOHNSON:

We those of you who are just tuning in, you are listening to the Clinicians Roundtable on ReachMD XM157, The Channel For Medical Professionals. I am Dr. Shira Johnson and I am speaking today with Dr. Mitchell Levy of Brown University. We are discussing the association between critical care management and patient mortality in the ICU unit.

DR. SHIRA JOHNSON:

So, go ahead Dr. Levy, you were telling us about how you attempted to compensate to calculate who the sicker patients and make that across the board that you were comparing apples and apples. For those of us who are students of statistics, how exactly do you take that out of the equation?

DR. LEVY:

Well, what you do is there are many severity scores that is your patient is your mechanical ventilator, is your patient over the age of 70, is your patient in shock, is your patient have low platelets? So, there are ways to ascribe a score to how severe the patient is in terms of illness and then group the patients according to the score and so that even though there might be in a 100 bed hospital, if their score is X, you can compare the same patients with the score of X in a much larger hospital of 500, 700, 1000 bed hospital. So, you group the patients according to the score of the severity of the illness and therefore, you try to be able to compare them, which is what we did and as I said, it is never perfect and that may be one of the major flaws. On the other hand, it is possible that this statement is true that that in fact management for at least some of the patients by critical care physicians may lead to a higher mortality. The reason that is also

suggested is rebuilt of what is called the propensity score. We took the factors that make it likely that a general practitioner would ask a critical care practitioner managing patient that we made a score out of it as well and what we found is in the patients, who had the lowest score, that is the lowest number of factor, it might make it likely for a generalist to ask for help from a critical care doctor. In those patients with that low score, they actually have the highest mortality rate. So, there was..

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