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Gorkem Sezgin, et al.

Laboratory Test Utilization and Repeat Testing for Inpatients of Age 80 and Over in Australia: A Retrospective Observational Study.

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Guest: Mr. Gorkem Sezgin is a researcher at the Australian Institute of Health Innovation at Macquarie University.

Randye Kaye:

Hello, and welcome to this edition of "JALM Talk," from the *Journal of Applied Laboratory Medicine*, a publication of the American Association for Clinical Chemistry. I'm your host, Randye Kaye.

Advances in healthcare have led to increases in human life expectancies. However, with aging populations comes increased demand on hospital resources and hospitals are faced with caring for increasing amounts of elderly patients. These patients are more likely to have chronic conditions and/or comorbidities, that require a longer hospital stays and coordination between multiple clinical specialties. Laboratory tests play an essential role in the care of older patients. However, frequent blood draws and repeat testing may cause physical pain and discomfort, and may be especially risky for older patients who may experience complications such as infections or anemia.

An original research article published in the September 2019 issue of the *Journal of Applied Laboratory Medicine* describes a study which investigated whether laboratory tests were being properly utilized for hospitalized patients aged 80 years and older. The corresponding author of this study is Gorkem Sezgin. Mr. Sezgin is a researcher at the Australian Institute of Health Innovation at Macquarie University. His primary research focus is understanding how laboratory tests are used by clinicians in both hospitals and primary care clinics.

Mr. Sezgin is our guest for this podcast. Let's start with this, what was your motivation for investigating laboratory testing conducted on older hospitalized patients?

Gorkem Sezgin:

Well, populations across the globe are aging and we're all inevitably getting older. On the bright side, our life expectancy is increasing. But with old age, you know, you get health problems. Just the other day while I was stretching, I hurt my muscle. So things we're neglecting in our younger years might be catching up on us or we might be having issues which occur just because we're getting

older and we make more visits to the doctor or even to the hospital.

And as we get older, we might have chronic conditions and comorbidity is coming up. So this all adds up to a high demand on healthcare. We expect and are already seeing that there's an increased demand on healthcare resources with all the hospital patients. And we need to make sure the healthcare systems are able to care for these patients efficiently. Otherwise, we might have problems with the quality of healthcare that we provide and the cost of healthcare might increase as well.

And if patients are staying longer than they need to, or are having procedures done that are not necessarily beneficial for them, this means that the resources are being wasted where it could be used more efficiently elsewhere. And this is bad for the patient as well. So very old patients are vulnerable to complications and infections. So you want to be certain that they are receiving appropriate care.

And what we did was we explored areas where we might improve care for older patients so that we don't have these issues.

Randye Kaye: Okay. Thank you. Yes, a lot of that make sense and the problem will probably continue to increase. Can you describe the sample population of patients that you included in this study?

Gorkem Sezgin: So the study was based on hospital patients. We used data mining techniques of patient administration systems and laboratory information systems to source our data. And we did this from several hospitals across New South Wales in Australia. And the way we did this was, our research team at New South Wales Health Pathology kindly provided us de-identified data. And this data, it was fragmented, that means that they were different datasets for admissions and patient information and a separate dataset for laboratory test information in this result.

So what we did was, we linked these two datasets by using a unique key that provided us a whole data set containing information about test orders, timeline of care for each patient and including a few demographic information such as age and gender. And then we checked the data quality and validated this data. So by using these data stored in electronic health records in this way was very valuable to our health researchers. In the last decade or so, we saw a large uptake in electronic health software use. And we can now say that electronic recording and electronic tools are widely used across hospitals and even in primary care clinics.

So this vast amount of data provided to us, we can use to provide back to the healthcare systems some feedback in how they can improve the care and quality of the care that they provide. And we can even create decision support tools which can be directly implemented into these electronic health records softwares. So the findings of our study were based on data mining of electronic health records and this provides valuable information that can be used to improve healthcare.

Randye Kaye: All right. Thank you. Can you tell me more about what your study found about repeat testing among older hospitalized patients?

Gorkem Sezgin: Mainly it tells us that repeated testings are happening at set intervals and for most commonly ordered tests, once every 24 hours. So we found that electrolytes, urea, and creatinine, which are three tests that are generally ordered together, with complete blood test, which is a very commonly ordered test that you generally get when you go to a doctor for a checkup. And calcium magnesium phosphate test, liver function test, and C-reactive protein test. These are all the most commonly ordered tests and they have frequent repeats.

So what we found was the repeat testing for electrolytes, urea, and creatinine, complete blood test and C-reactive proteins are actually fine. So the guidelines suggest them to be repeated within 12 to 24 hours, which is what we see in hospital as well. But for calcium magnesium phosphate and liver function test however, the guidelines suggest them to do repeated at least, we prefer a six-hour interval in between the test. What we see is, there's 24 hours between these tests.

When you take readings at 24-hour intervals for these tests, the result generally do not provide any valuable clinical information, unless the doctor provided medication for the patient and needs to check the effect of the medication. What we saw in the study was the repeat testings happen at intervals. So in 24 hours, 48 hours, and 72 hours. So we suspect that this is not the case where the doctor implements medications. It's more of a hospital policy where the tests are repeated within 24-hour intervals.

So what happens when the doctors take readings before the interval? The likely effect is that the result value doesn't change and the doctor might conclude that the patient's condition is stable if the first reading was normal or the patient's condition didn't improve if the first reading was abnormal. So in the first case where the patient's condition was normal, the patient may be discharged early or if the

condition was abnormal, the patient may end up staying longer than they need to in the hospital. And both of these hypothetical scenarios are undesirable especially for older patients.

Randy Kaye: I can see that, thank you. You've already shared a great deal of valuable information. But would you please share anything else that you would like researchers or clinicians to take away from the results of your study.

Gorkem Sezgin: So I think the important point of these results is that decision makers in healthcare, whether it be doctors or hospital policy makers, they should take into consideration to guidelines. Particularly for a laboratory testing, the guidelines on how and when test to be ordered and interpreted. And there are many such resources available that can be readily access. Of course, the ultimate aim is to provide good healthcare efficiently and evidence-based research can provide this.

Having said that, electronic health records such as the one used in our research are valuable resource that can be used to improve healthcare and provide evidence-based information. Making sure that these resources are robust, that is they are being used frequently and as intended, can go a really long way into improving healthcare. Hopefully, we will see these resources being used more and more in research.

Randy Kaye: Thank you very much, very interesting. Thank you so much for joining us today.

Gorkem Sezgin: Thanks for having me.

Randy Kaye: That was Gorkem Sezgin from Macquarie University, describing his original research article from the September 2019 issue of JALM, "Laboratory Test Utilization and Repeat Testing for Inpatients of Age 80 and Over in Australia: A Retrospective Observational Study." Thanks for tuning into this episode of "JALM Talk." See you next time and don't forget to submit something for us to talk about.