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Leading research at Oxford leads to Best Practice Award for their pre-eclampsia care

Oxford University Hospitals NHS Foundation Trust and Nuffield Department of Women's & Reproductive Health are innovators in clinical practice for the detection and care of pre-eclampsia (PE) in pregnant women. Traditionally, determination of blood pressure and urine proteinuria are used to identify PE in pregnant ladies, but these methods are often inaccurate (PPV of only 20% for the prediction of adverse outcomes).

Pictured above are some of the Oxford team that worked on the preeclampsia testing developments
From left to right: Lorenz Quezon, Catalina Carrasco Alvarez-Ossorio, Matthew Covill, Manu Vatish, Joao Leite, Linda Holden, Tim James, Sofia Cerdeira. Not pictured: Guy Checketts, Julia Eades

Therefore, the clinical diagnosis of PE is often uncertain. Dr. Manu Vatish states "Pre-eclampsia is a condition of pregnancy that is surprisingly difficult to diagnose. The problem is that we diagnose it by high blood pressure and proteinuria, but lots of pregnant women have high blood pressure or proteinuria, for lots of reasons, therefore a lot of women are admitted that probably do not need to be."

Their team recognized that PE is a pregnancy specific medical condition that has potentially severe sequelae for both mother and child. They appreciated the difficulties that clinicians experience when diagnosing and managing PE in an outpatient setting, causing inappropriate admissions of those without the condition, and occasionally discharge of patients with PE considered not to have the condition based on conventional clinical assessment.

Thus, their team led cutting edge research to investigate the use of new biomarkers and clinical algorithms to guide diagnosis and management of PE. Their avant-garde approach to fill this clinical care gap involves the use of the ratio of fms-like tyrosine kinase 1 (sFlt-1) to placental growth factor PlGF), novel angiogenic biomarkers for PE, combined with an update to clinical guidelines to assist appropriate interpretation of the biomarker results and direction on appropriate subsequent clinical care. Execution of their research and new clinical care guidelines required close collaboration between stakeholders in Laboratory Medicine, Obstetrics, Hospital Administration, and Industry including Market Access.

When test results are interpreted with the updated care guidelines, clinicians have an evidence-based tool to aid in the management of PE. "This test has improved our ability to make the right decision on admission. Using the test, no one with pre-eclampsia within one week has been missed, so understandably, it has been welcomed enthusiastically by midwives and clinicians working here at the John Radcliffe Women's Centre, so we're delighted that it is being made available for women elsewhere in the country," said Dr. Sofia Cerdeira, an OUH obstetrician registrar and Academic Clinical Lecturer at the University of Oxford's Nuffield Department of Women's & Reproductive Health. With a NPV of 99.3% for 7 days, such confidence is shown in numbers, with a 30% reduction in admissions for suspicion of PE, while simultaneously improving detection of PE in patients who did not present with overt symptoms of the disease.

Their initiative leveraged the expertise of the Clinical Biochemistry Laboratory combined with their industry partners to develop the methodology of the biomarker tests. In the validation of the assay the Clinical Biochemistry Laboratory collaborated closely with their colleagues in Obstetrics using their extensive bio-library and clinical data tied to the samples. As part of the validation the laboratorians work together closely with clinicians to update clinical guidelines in order to ensure the end users-clinicians would use the biomarkers results correctly. Once the method of the testing was validated their team performed a clinical trial that demonstrated improved patient outcomes when the test is utilized. Their unified efforts optimized the clinical utility of the information provided from the biomarker tests.

The success of the clinical trials with the assistance of hospital administration helped bring these tests and updated clinical guidelines into routine practice at Oxford University Hospitals NHS Foundation Trust and Nuffield Department of Women's & Reproductive Health. Linda Holden, a midwife at John Radcliffe Hospital, stated "Having a test that effectively triages patients into high-risk and low-risk groups means we can focus our care more effectively."

During and subsequent to their work many facilities in the UK have reached out to receive guidance and assistance with implementing both the testing and updated clinical guidelines. They are also facilitating the implementation in other countries including Japan, China, Sri Lanka, Canada, South Africa and Nigeria.

Based on the measurable success of this care initiative a clinical team led at this site became one of the winning teams of the prestigious 2019 UNIVANTS of Healthcare Excellence Program award. This international honor was awarded by leading global healthcare organizations including IFCC, AACC, EHMA, Modern Healthcare, NAHQ, and IHE through leadership and sponsorship by Abbott Laboratories.

THREE KEY TAKEAWAYS:

1. Valued research and cross-functional collaborations are necessary to transform clinical care.
2. Best practices have begun to utilize novel biomarkers to appropriately risk stratify patients at risk of pre-eclampsia to drive transformational change to clinical care.
3. Key performance indicators for the application of novel assays and algorithms into clinical care can include improved patient safety, increased clinician satisfaction, and better resource allocation.