



VOICE OF THE CUSTOMER



MAXIMISING OPERATING ROOM EFFICIENCY AND PATIENT SAFETY WITH POINT-OF-CARE TESTING

The Acute Care facility at King's College Hospital is located in the London Borough of Lambeth and is managed by King's College Hospital NHS Foundation Trust. One of the leading centres in Europe for clinical research, the hospital carries out approximately 1000 cardiothoracic operations each year, within its cardiovascular operating rooms (CVOR's).

As well as Cardiothoracic surgery, King's manage a wide range of non-invasive investigations using the latest, cutting-edge technology to help diagnose underlying heart conditions; they also provide nationally and internationally recognised work in liver disease and transplantation, neurosciences, haemato-oncology and fetal medicine.

Throughout the hospital, point-of-care diagnostics are utilised within the cardiac operating theatres, the clinical perfusion team are supported by point-of-care testing in the form of the i-STAT Alinity for running blood gases. Through access to the handheld blood analysers in the operating theatres, the team has been able to restructure their working patterns when treating patients, utilising cardiopulmonary bypass for coronary artery disease, aortic and mitral valve stenosis or regurgitation, percutaneous aortic valve surgery and endocarditis of heart valves. With the use of the i-STAT Alinity the whole team has become more efficient which has increased their provision of quality care.



THE CHALLENGE

During each procedure, the time element for taking blood gases is problematic in the CVOR, as it can impact on staffing, especially in a large hospital like King's, where it would mean losing a member of the operating room team for some time if they had to walk off with a sample. As interventions become more complex, the threat of an incomplete CVOR team could have serious consequences for patient safety.

The Clinical Perfusion department supports weekly scheduled and urgent operating lists which include procedures like coronary artery bypass, repairing or replacing faulty heart valves, including the hospital's highly successful percutaneous TAVI valve replacement programme, and aortic surgery for repair of aneurysms and dissections.

"Within our cardiac theatres we perform a minimum of 1000 open heart surgeries a year" explains Michael Whitehorne, Head of Clinical Perfusion Science at King's College Hospital.

In theatres, there are challenges with running blood gases and obtaining access to the results quickly, especially as most procedures take a minimum of four hours and require blood gas analysis every 10 to 15 minutes. Operating Department Practitioners (ODP) have in the past, been sent to run blood gases on the hospital's bench top blood gas machines during a procedure. These machines can be located a fair distance away from the theatres and frequently, the machine could be calibrating for anything between 6 to 15 minutes, depending on its daily throughput. This can have a major impact on the timely delivery of the gas result and the team, who are affected if someone needs to leave the room to run a test.

Within the CVOR, the *i-STAT Alinity* is used by King’s clinical perfusion team during cardio pulmonary bypass whilst the patient is “on pump” to ensure both the patient and the procedure remain as independent as possible. While on bypass, the patient must undergo regular tests of their blood gases, electrolytes, haemoglobin and haematocrit, which require quick results. During the procedure the heart-lung machine keeps blood and oxygen flowing through the body as the temperature of the patient is reduced. Cardioplegia (which induces the intentional and temporary cessation of cardiac activity) has been administered, therefore checking the patient’s health throughout is vital. Once the operation ends and it’s time to get the patient’s heart and lungs started again as well as re-establishing the patient’s normothermia during the ‘re-warm’ phase, this is when complications could normally arise and when management of the patient becomes quite acute.



“Sampling the patients’ blood in this way ensures safety. Should a blood sample need to make its way to the laboratory, results could take up to an hour to come back, which is not useful at all, as a lot could have changed in that time.”

Michael Whitehorne, Head of Clinical Perfusion Science at King’s College Hospital

Cardiac patients often have impaired electrolyte profiles by the time they arrive in the cardiac operating room (OR). Samples taken from the indwelling arterial catheter are analysed for blood gasses, electrolytes, haemoglobin and haematocrit, metabolic parameters as well as blood glucose. An arterial blood sample is routinely checked either prior to the induction of anaesthesia or very shortly after; while the patient is on CPB, samples will be analysed roughly every 20 to 30 minutes and prior to separation from bypass; at least one more sample is obtained before the patient leaves the OR. That means that during a low risk, single-procedure case an average of five arterial blood samples have to be processed.

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THE SOLUTION

The portable, handheld *i-STAT Alinity* provides lab-quality test results, within the CVOR—helping the clinical perfusion team at King’s remain with the patient during the entire procedure.

The CVOR team at King’s have been using the *i-STAT* for more than 20 years. As one of the earliest adopters of POC usage in this way, they ensure all vital tests are run “at the pump” and rely on the *i-STAT Alinity* to assist in maximising operating room efficiency and increase patient safety.

The clinical perfusionist and consultant anaesthetist want results about the health of the patient quickly. Through using the *i-STAT Alinity*’s CG8+ and CG4+ cartridges for blood gas, electrolytes, haemoglobin, haematocrit and metabolic parameters, it provides them all the analytes they need. The system is ready to use 24/7 and has the additional benefit of no maintenance or time-consuming calibration requirements.



CASE STUDY 1

Recent bypass surgery performed on a 72-year-old male, required the use of the *i-STAT Alinity* and its CG8+ cartridge. The CG8+ test found the patient was found to have low potassium, requiring potassium to be administered intravenously to prevent risk of cardiac arrhythmia or irregular heartbeat, both of which could lead to poor cardiac function.



CASE STUDY 2

During the recent aortic valve replacement surgery of a 68-year-old female, it was important that the patient was kept oxygenated to prevent tissue hypoxia. CO₂ and oxygen levels were regularly monitored to ensure adequate levels of oxygen was present within the blood, ensuring the vital organs, such as the brain, liver and kidneys, were functioning optimally.



Cases described above are fictional and images are not actual patient images.

*Photo Credit: Mckayla Whitehorne-King



THE RESULT

The introduction of the *i-STAT Alinity* enables results from tests such as blood gasses, electrolytes, and haematocrit to be immediately available at the point-of-care.

The clinical perfusion team at King's College Hospital follow a tight protocol for the monitoring and assessment of their patients and their physiological parameters. They must closely measure and record information about the patient's health within their 'Pump charts', which in most circumstances call for a test to indicate the patient's health every 10 to 15 minutes.

"It is crucial that a full team is retained within the CVOR at all times. Each member of the team provides a unique and vital role in ensuring that the patient receives the highest quality of care throughout" explains Michael Whitehorne.

Prior to the introduction of the *i-STAT Alinity* handheld device, an important member of the CVOR team such as the ODP would continually be required to leave the OR to perform these tests and obtain results from a location remote to the CVOR. This vital member of the team would spend up to 20% of the time away from the OR whilst performing this task. The *i-STAT Alinity* has negated the need for this absence therefore allowing my perfusion team freedom and independence in analyte testing ultimately leading to improved patient care.

"The results we get steer the course and the actions we take are based on the true result we see. For example, if the results indicate respiratory acidosis in a patient, or a low PH level with increased PCO₂, then we have the ability to act upon it. Damage can be caused to the patient if that action comes too late, it really needs to be corrected at the time the test occurs."

Michael Whitehorne, Head of Clinical Perfusion Science at King's College Hospital

What has having POC meant for King's CVOR?

- More time in the theatres for all members of staff
- No downtime on the instrument for calibration
- Easy connectivity of the device into heart and lung by-pass machine
- Portability of the device next to the by-pass machine
- No need for a separate person, the primary perfusionist can manage the tests



LAB-ACCURATE RESULTS IN MINUTES Have the clinical information needed to make treatment decisions during the patient's visit.



IMPROVE PATIENT SATISFACTION Minimize delays in care and reduce return visits due to unavailable lab results, which can improve patient satisfaction.



SIMPLIFY TESTING Easy, intuitive operation.



BROAD TEST MENU Lab-accurate results for a wide range of tests, including chemistries, blood gas, coagulation, cardiac markers, and more.



OPTIMIZE SYSTEM EFFICIENCY Eliminate process steps and handoffs, helping to reduce errors.

i-STAT Alinity



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