Issue 9, January 2009

ANZHSN Bulletin

'New health technologies identified through the Australia and New Zealand Horizon Scanning Network (ANZHSN)'

In This Issue...

Australian Government
Department of Health and Ageing

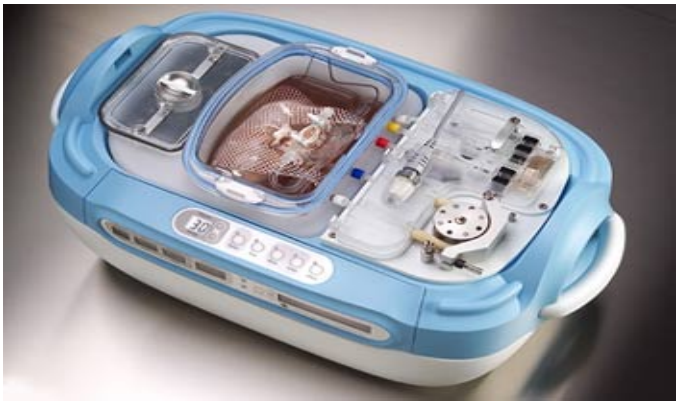
Happy New Year and best wishes from the ANZHSN!!

LifePort® kidney transporter

Kidney transplantation is both cost-effective and an ideal treatment option for patients with end-stage renal failure. The deprivation of oxygen and nutrients caused by ischaemia may lead to permanent damage, therefore preservation of kidney viability between retrieval and implantation is important. To preserve function two strategies have been used: cold storage (CS) and machine perfusion (MP). Damage is reduced during CS by slowing the metabolic rate. The kidney is flushed through with a perfusion or preservation fluid and then kept on ice. MP uses a machine to pump a cold perfusion solution through the kidney, and provides oxygen and nutrients, allowing the kidney to continue metabolism.

HOW IT WORKS

The LifePort® device is a portable machine perfusion unit that is designed to contain and perfuse a transplantable kidney under cold and asceptic conditions. Although relatively compact (dimensions 61x37x36cm) the unit weighs 20 kg and would therefore require two people to transport it. The unit can be used for up to 24 hours before battery replacement and ice replenishment is required. The LifePort® device may have the potential to increase the number of organs able to be transplanted by increasing the viability of transported kidneys (1).



Above: The LifePort® kidney transporter
(Source: http://www.medgadget.com/archives/img/kidney_trans_big.jpg)

THE EVIDENCE

A recent study attempted to transplant 44 kidneys from 22 non-beating heart donors. Each pair of kidneys from one donor was divided by the type of preservation with one kidney preserved using conventional cold storage whilst the other was preserved using the LifePort® machine perfusion device. Five kidneys that were to be transplanted into the cold storage group were deemed to be non-viable and discarded, as was one kidney in the LifePort® group. Viability was assessed during biopsy and degenerative changes observed resulted in the kidneys being discarded. Early clinical outcomes assessed in this study included: immediate function, delayed graft function, haemodialysis/ 30 days, creatinine level (at 1 day, 21 days, and 90 days post-transplantation), hospital stay, acute rejection, primary non-function transplant, and surgical complications.

There were significant differences between cold storage and the LifePort® machine perfusion patients in all reported outcome categories. Thirty per cent more kidneys in the machine perfusion group experienced immediate function ($p<0.001$) and there was a significant reduction in the number of kidneys with delayed graft function ($p<0.001$). There were no non-functioning transplants in the LifePort® group compared to three in the cold storage group (2).

An earlier small scale study was reported by the same author. A total of 14 kidneys from seven non-beating heart donors were transplanted into 14 recipients. One kidney from each donor was preserved using conventional cold storage whilst the other was preserved using the LifePort® machine perfusion device (level III-2 intervention evidence). The average warm ischaemia time (time between declaration of death to time cold perfusion began) was 25.5 ± 13 minutes. The average cold perfusion time was the same in both groups at 18 ± 6 hours. Unfortunately the results of this initial study were omitted in the published paper. The evaluators contacted the author who is yet to respond (3).

FUTURE STEPS

Based on the good quality, albeit small evidence base and the obvious benefits to the patient of receiving a viable, functioning kidney transplant, and the possibility of increasing the number of organs exchanged between countries and states, HealthPACT recommended that this technology be monitored.

Written by Linda Mundy, AHTA

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Rapid testing and screening for Helicobacter Pylori

Helicobacter pylori (H pylori) is a bacteria which may cause gastritis and peptic ulcers and a progression from these ailments may lead to gastric cancer. It has been accepted as a major contributor to the development of gastric cancer. Much of the world's burden of gastric cancer is thought to be caused by H pylori (1). There are calls to investigate the potential to eradicate H pylori in high risk populations (2).

HOW IT WORKS

Rapid faecal H pylori antigen tests are generally based on immunochromatographic reactions between monoclonal antibodies to H pylori and H pylori antigens that may be present in the patient stool sample. Stool samples are diluted in a specific diluent and subsequently applied to a support matrix. A positive test for H pylori infection is indicated by the appearance of both a control line and a test line on the support matrix. A negative test is indicated by the appearance of only the control line. Any other combination or lack of lines on the matrix indicates an invalid result. Additionally, enzyme-linked immunoassays can also be used to diagnose H pylori infection from stool samples, however these tests are more resource intensive and are not as rapid.

Screening for Helicobacter pylori could be provided to high risk populations using existing infrastructure and diagnostic tests within Australia. Following identification of infected individuals, eradication of the pathogen could be performed which may reduce the risk of gastric cancer.

THE EVIDENCE

A study with a population of 240 patients evaluated two stool based H pylori tests against histology, rapid urease test, urea breath test and bacterial culture. Patients were deemed positive if the culture results were positive, or if two or more of the histology, rapid urease test or urea breath tests were positive. The patients were tested both before and after H pylori eradication therapy. The tests used were the ImmunoCard STAT! HpSA (immunochromatographic test) and the Premier Platinum HpSA (EIA). The post-eradication testing was performed 2-4 months after the completion of the eradication therapy. In the pre-eradication group, the sensitivity, specificity, and diagnostic accuracy were 95.2%, 87.0%, and 91.5%, respectively, for ImmunoCard HpSA STAT, and 83.8%, 90.9%, and 86.9%, respectively, for Premier Platinum HpSA. In the post-eradication group, the sensitivity, specificity, and accuracy were 100%, 91.0%, and 94.0%, respectively, for ImmunoCard HpSA STAT, and 84.9%, 92.5%, and 90.0%, respectively, for Premier Platinum HpSA. There were no statistically significant differences between these two stool tests (3). Three other studies, which were included in the summary, also demonstrated that H pylori rapid diagnostic stool tests showed good sensitivity with excellent specificity (4, 5, 6).

There were three studies analysing the clinical impact of screening for and eradication of H pylori. In a ten year follow-up study, Ford et al (7) investigated the health costs in a prospectively recruited population of 8,407 people. Of these subjects 2,324 tested positive for H pylori and were randomised to the intervention group (n=1,161) or the placebo group (n=1,163). Ten years after the end of the eradication therapy 919 (40%) agreed to allow analysis of their records for the purposes of the study. No malignancies were reported in either group analysed at 10-years. The authors observed a non-significant trend of reduced symptomatic dyspepsia in the intervention group. There was a reduction of dyspepsia related costs at 10 years of $US117 (95% CI [$11, $220]; p=0.03). This reduction was greater than the original costs of screening and eradication treatment. This result was supported by the other two studies, which indicating that there might be significant dyspepsia related savings made when screening and eradication of H pylori was carried out in a population (8, 9).

FUTURE STEPS

Given the potential links to gastric cancer and lymphoma, HealthPACT recommended that a Horizon Scanning report be commissioned, combining an assessment of rapid testing for Helicobacter pylori and screening for Helicobacter pylori in targeted populations.

Written by Adrian Purins, AHTA

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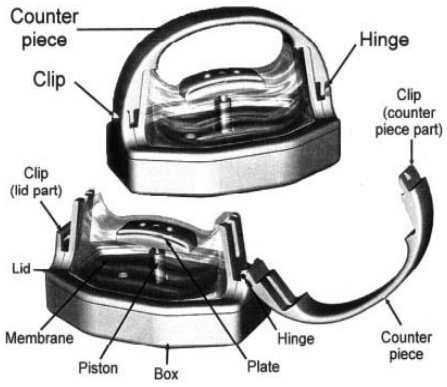
FloWatch-PAB pulmonary artery banding for congenital heart defects

Congenital heart defects may be abnormalities of the heart, heart valves, arteries, central blood vessels or a combination of cardiac structures (1). The most common defects affecting the cardiovascular system include functionally univentricular heart, transposition of the great arteries (TGA), and ventricular septal defect (VSD).

Pulmonary artery banding (PAB) is commonly used in a subset of patients where primary complete repair of their cardiac anomalies is not possible. This predominately includes patients in infancy and early childhood who are generally unable to undergo surgical repair because of their age and small size (2). The main objective of PAB is the palliation of cardiac condition in infants and children until such time they are eligible for full repair of their condition.

HOW IT WORKS

FloWatch-PAB is a wireless device that is surgically implanted around the pulmonary artery (PA). The device can be closed or opened repeatedly by remote control without the need for an invasive reoperation to adjust the band as is required in conventional PAB techniques. FloWatch-PAB may also reduce damage to the PA upon debanding, eliminating the need for reconstruction. The FloWatch-PAB consists of an implantable band, powered by an external antenna and control unit. The band has a piston activated by a micro-motor that adjusts the degree of PA constriction according to commands received from the external control unit. The device can be inserted by thoracotomy, or via median sternotomy if an associated procedure is being carried out concurrently. The maximum distance suitable to transmit energy and instructions from the external antenna to the device itself is 4cm (2).



Left: FloWatch-PAB device in closed and open position (3)

THE EVIDENCE

In a prospective, nonrandomised comparative study (4), 40 consecutive infants underwent PAB using the FloWatch-PAB device or conventional PAB. The allocation of patients into treatment groups was determined by the availability of the device. Indications were preparation for biventricular repair in 16/20 infants, univentricular repair in 2/20 infants, and left ventricular retraining in 2/20 infants in the conventional PAB group versus 13, 5 and 2 of 20 infants, respectively, in the FloWatch-PAB group. The mean duration of preoperative mechanical ventilation for the FloWatch-PAB group was significantly longer than that for the conventional PAB group (17.5 days vs. 3.3 days, $p<0.005$).

Safety outcomes were not reported. Death was measured as an effectiveness outcome. The total number of deaths, as well as the number of early and late deaths, was not significantly different between the 2 groups. There were no early (< 20 days) deaths in the FloWatch-PAB group and in the conventional PAB group early deaths were caused by cardiac arrest during tracheal suctioning, inexorable heart failure and multi-organ failure. There were no PAB-related reoperations in the FloWatch-PAB group, whereas 35% (7/20) of infants required reoperation in the conventional PAB group ($p<0.005$). Postoperative mechanical ventilation and intensive care unit and hospital stays were significantly longer after conventional PAB compared to FloWatch-PAB, respectively (10.4 ± 11.2 vs. 3.0 ± 3.1 days, $p<0.01$; 20.3 ± 19.9 vs. 5.3 ± 4.6 days, $p<0.005$, and 45.6 ± 41.6 vs. 15.4 ± 6.4 days, $p<0.005$). Average cost of stay in the intensive care unit and hospital was, respectively, $45,000 and $45,300 cheaper with FloWatch-PAB than the average cost with conventional pulmonary PAB, largely surpassing the cost of the device ($10,000).

Two prospective case series were also included in the summary for assessment (3, 5).

FUTURE STEPS

Based on the lack of high quality evidence and potential uptake of the technology HealthPACT recommended that this technology is monitored for 12 months.

Written by Deanne Leopardi, ASERNIP-S

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Circumferential radiofrequency ablation for Barrett's oesophagus

Barrett's oesophagus is a condition where the normal oesophageal cells are replaced with intestinal columnar epithelium, and is commonly diagnosed in patients suffering from chronic gastroesophageal reflux disease (1). A normal oesophagus is lined with flat, thin squamous cells and when the oesophagus is exposed to gastric juices these cells become irritated. When untreated, a constant exposure to reflux conditions can cause metaplasia in the oesophagus resulting in the development of intestinal columnar epithelium. This metaplasia can continue, increasing through low-grade to high-grade dysplasia and culminating in invasive cancer (2). The current endoscopic therapies for removal of the Barrett's epithelium include argon-plasma coagulation, electro-coagulation and laser ablation. (3)

HOW IT WORKS

HALO^{360} circumferential radiofrequency ablation system allows the inner diameter of the oesophagus to be ablated quickly during an outpatient procedure, with uniform removal of epithelium to a controlled ablation depth. The patient is placed under conscious sedation and a sizing balloon is used to measure the inner diameter of the oesophagus. An appropriately sized radiofrequency (RF) ablation catheter is selected and introduced over a guidewire in a side-by-side manner with an endoscope. The catheter's balloon is then inflated and energy applied, circumferentially ablating the epithelium to a depth of less than 1 mm. The catheter is then removed and cleaned, and reintroduced if necessary. The clinician removes the ablated epithelium using irrigation and suction using the endoscope.

THE EVIDENCE

In one randomised controlled trial (RCT), 13 patients with adenocarcinoma at or near the gastroesophageal junction were enrolled. The patients all underwent ablation prior to oesophagectomy, and were randomised to one of three energy density groups: 8, 10 or 12 J/cm^2. After using the 8 J/ cm^2 setting in one patient, the authors determined that the ablation effect at that setting was negligible and all remaining patients were randomised to either 10 or 12 J/ cm^2 RF energy was applied one time (1x) proximally and two times (2x) distally. Outcomes were compared according to energy density group and 1x vs 2x treatment. Complete epithelial ablation was consistently achieved at 10 J/ cm^2 (2x) and 12 J/ cm^2 (1x or 2x). The maximum ablation depth was directly related to energy density and, for the 10 J/ cm^2 sections, to the number of ablative treatments (1x vs 2x). The maximum depth of injury was the muscularis mucosae: 10 and 12 J/cm2 (both 2x). The maximum ablative depth for zones treated with 8 J/ cm^2 (1x or 2x) was mid epithelium. There were no device malfunctions and no other complications relating to the ablation procedure were reported. One patient had a superficial mucosal injury that occurred during sizing and may have been due to previous radiotherapy (4).

The other RCT involved eight patients with histopathologically diagnosed high-grade dysplasia. All patients underwent ablation prior to oesophagectomy and were randomised to receive 10, 12 or 14 J/cm^2 of energy density and 2, 3 or 4 applications. The authors concluded that complete ablation of high-grade intestinal metaplasia without ablation of submucosa is possible using the HALO^{360} system. Ablation depth is dose related and limited to the muscularis mucosae. In one patient, small residual foci of IM-HGD at the edge of the ablation zone were attributable to incomplete overlap, which can be avoided. No device-related adverse events were observed (3).

One case series were also included in the assessment (5).

FUTURE STEPS

Based on the lack of RCTs which compared circumferential radiofrequency ablation to other therapies for Barrett's oesophagus, the potential of this technology as an alternative remains unclear. As studies with longer follow up are required, the HealthPACT recommended that this technique is monitored for 12 months for future developments.

Written by Caryn Perera, ASERNIP-S

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Percutaneous endoscopic colostomy

HOW IT WORKS

Percutaneous endoscopic colostomy (PEC), a variation of percutaneous endoscopic gastrostomy (PEG), involves the advancement of a flexible, illuminated colonoscope, under laparoscopic control, through the anus into the proximal (upper) sigmoid colon until the loop comes into contact with the abdominal wall (1, 2). A small incision is made at the determined left lower abdominal site and a needle cannula is then inserted through the incision, abdominal and sigmoid walls and into the lumen of the bowel. A plastic-covered guide wire is progressed through the cannula and retrieved out of the anus. The scope is removed and a PEG-type catheter attached to the guidewire, which is then retracted back through the abdominal incision, securing the sigmoid loop to the abdominal wall (1). The catheter is attached to a drainage bag which is flushed twice daily; the tube may remain in situ long- or short-term, depending on the indication for treatment (3). Standard bowel preparation and prophylactic antibiotics are administer prior to treatment using PEC. The procedure usually takes place under sedation and local anaesthetic (2).

The most common indications for PEC include recurrent sigmoid volvulus and colonic pseudo-obstruction (3). PEC is an alternative procedure for patients who have undergone conventional therapy for colonic dysfunction without success or for patients where invasive surgery is an unsafe option.

THE EVIDENCE

In a prospective study (4), 33 patients with recurrent sigmoid volvulus, severe idiopathic slow-transit constipation, or recurrent/ unremitting pseudo-obstruction were referred to receive PEC. Forty-two per cent (8/19) of patients undergoing PEC for recurrent sigmoid volvulus died from unrelated causes, generally reflecting the frailty of this cohort. Of the total population, 30% (10/33) of patients had their PEC tube removed between 28 days and 29 months postoperative; 6 with recurrent sigmoid volvulus, 3 with constipation and 1 with pseudo-obstruction. Three patients developed peritonitis due to faecal contamination, of whom one died. Minor complications occurred in 30% (10/33) of patients, they included site infection (n=6), abdominal wall bleeding (n=2) and one patient with buried bumper syndrome. Symptoms resolved in 26 patients (74%). PEC was eventually successful in 75% (18/24) of patients who survived the duration of follow-up. The procedure failed in six patients with slow transit constipation.

In a retrospective study (5), 31 patients received PEC tube insertion for functional constipation, recurrent sigmoid volvulus, colonic pseudo-obstruction, or neurologic constipation. Thirteen per cent (4/31) of patients had their procedures abandoned because a suitable site for PEC insertion could not be found; therefore, in the remaining 27 patients, 28 tubes were inserted into the left side of the colon. Mortality was high (26%), with 7 deaths: 5 from unrelated causes and 2 deaths from faecal peritonitis. Localised peritonism developed in 18 patients (67%). Other complications included formation of granulation tissue, buried internal bolster, leakage, painful episodes and infection. After PEC tube insertion, symptoms were reported as improved in 22 (81.5%) patients. Of the 28 tubes inserted, 2 remained in situ, 3 were removed electively, 2 were inadvertently dislodged and 16 were removed due to complications. In the remaining 20 patients, 18 no longer had tubes in situ, of these 5 continued conservative therapies, 2 were symptom free and 11 underwent a definitive surgical procedure.

One small case series was also included in the assessment (2).

FUTURE STEPS

Based on the quality of the evidence and the uncertainty of results reported, it is difficult to recommend the use of PEC. However, the procedure has the potential to treat a select group of patients who are unfit for surgery. It is recommended therefore that PEC is monitored for 12 months, with the view of collecting more comprehensive data on its potential utilisation.

Written by Deanne Leopardi, ASERNIP-S

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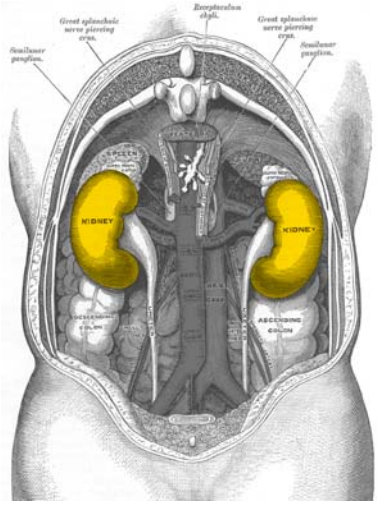
NxStage System One home dialysis

Chronic kidney disease is a major burden to the Australian healthcare system and its prevalence is rapidly increasing. The state where kidney function is reduced below a threshold, that is where the patient will die unless their kidney function is replaced by a transplant or dialysis, is known as end stage kidney disease (ESKD). Dialysis and kidney transplant are together known as renal replacement therapy (RRT). Dialysis takes one of two forms: haemodialysis and peritoneal dialysis. The majority of haemodialysis is generally carried out at a hospital or specialised clinic.



Left: Human kidneys viewed from behind with spine removed

Courtesy of Wikipedia Commons (http://en.wikipedia.org/wiki/Image:Gray1120-kidneys.png)

HOW IT WORKS

The portable and self contained NxStage System One allows home-based haemodialysis. The NxStage System One is the size of a computer monitor and weighs approximately 30 kg. The unit does not need the water supply modifications that other home haemodialysis units require as it uses bagged sterile dialysate fluid. Alternatively, with accessories, the NxStage System One can produce dialysate fluid from purified tap water. The unit is also portable allowing dialysis outside of the home. This device may improve the quality of life of haemodialysis patients.

THE EVIDENCE

A small, multi-centre prospective cross-over treatment study (n=32) was conducted comparing the NxStage System One to centre based dialysis. The treatment protocol consisted of eight weeks of centre treatment (6 conventional dialysis sessions per week), a two week in centre transition treatment (6 NxStage System One dialysis sessions per week), and an eight week at home treatment (6 NxStage System One dialysis sessions per week). There were significantly more adverse events associated with the centre based treatment (5.3 adverse events per 100 treatments) versus the home based NxStage System One treatment (2.1 adverse events per 100 treatments; p=0.007). Compared to baseline, patients experienced weight gain, had reduced blood pressure and reduced use of anti-hypertensive medications. This effect was not solely due to the NxStage System One device as the effect was also noted in the in centre based part of the study. This was attributed to increased dialysis treatments (6 /week) over the average baseline dialysis treatments (3 / week) (1).

A study of 19 patients assessed the basic markers of haemodialysis for patients using the NxStage System One and reported that greater than 85% achieved recommended urea clearance. Medications for secondary complications of chronic kidney disease (high blood pressure, anaemia) were reduced in more than 50% of patients. Patients reported increased energy, appetite, sleep quality and fewer symptoms when treated with the NxStage System One (2).

A small study of four paediatric patients has assessed a program of frequent dialysis (6 times weekly), rather than the standard centre based treatment of three times weekly. Patients were on standard dialysis before the trial, which ran for 16 weeks. Over the trial period the patients showed reductions in blood pressure and were removed from anti-hypertensive medications. Patients also had improved serum phosphorous levels without increased medication. A negative side effect attributed to the more frequent dialysis regimen was the lower haematocrit levels which required increased erythropoietin (3).

FUTURE STEPS

The NxStage System One provides greater versatility for patients requiring dialysis and may be especially useful in rural and remote populations. Based on the high need and potential great gains from the successful introduction of such a device into the Australian market and that there is a large ongoing trial it is recommended this the NxStage System One be monitored.

Written by Adrian Purins, AHTA

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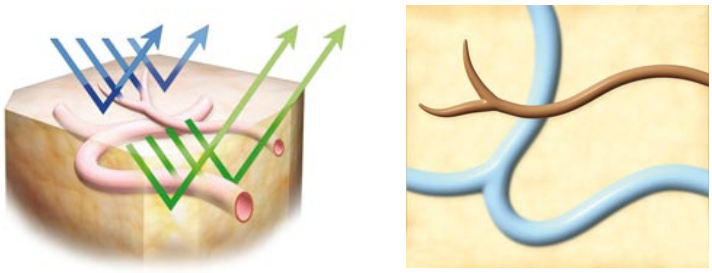
Narrow Band Imaging

HOW IT WORKS

Narrow band imaging (NBI) is an imaging technique that exploits the specific transmissibility and absorption characteristics of specific wavelengths of light. Longer wavelengths of light penetrate further into tissue and different wavelengths are absorbed differently by structures within the tissue. Specifically, blue light (415nm) allows the visualisation of the superficial capillary network as it does not penetrate the tissue to a great extent. Green light (540nm) penetrates further into the tissue allowing the visualisation of deeper structures such as sub-epithelial vessels. When images form the two light sources are combined a high contrast image of the tissue surface is generated.



Above: NBI Image acquisition. Blue light only penetrates the near surface, whereas green light penetrates to deeper structures (left). The combined image shows the capillaries in brown and the underlying veins in blue (right)

Courtesy of Olympus KeyMed:
(http://www.keymed.co.uk/index.cfm/page/products.index.cfm/id/869/navid/869/parentid/207)

Lesions visualised with NBI can be categorised using two different techniques. One method involves the analysis of microvasculature, with neoplastic lesions displaying increased or abnormal microvessel density. A second method developed by Kudo et al (1) involves analysis of the "pit pattern" of a lesion which results from the surface structures and superficial mucosal capillaries. The Kudo pit pattern allows the lesion to be graded on a scale from nonadenomatous to adenomatous. These methods are applicable to a variety of tissue types. This prioritising summary examines the use of NBI for the new indication of the detection of precancerous gastric and colorectal lesions.

THE EVIDENCE

Several studies have investigated the diagnostic ability of NBI for colorectal lesions compared to conventional white light colonoscopy and histology.

Adler et al investigated NBI in a trial where patients presenting for routine colonoscopy diagnosis were randomly assigned to either conventional or NBI colonoscopy. The study involved 401 eligible patients (200 NBI, 201 conventional colonoscopy) and found that the detection rate of adenomas was higher in the NBI group (23%) than the conventional group (17%), although this did not reach significance (p= 0.129). There was an apparent training effect involving the conventional method, where the first 100 patients showed a 26.5% adenoma detection rate for NBI and 8% for conventional colonoscopy, however the last 100 patients had an adenoma detection rate of 25.5 and 26.5% for NBI and conventional colonoscopy, respectively. The authors speculated that the improved polyp detection using NBI may increase the ability of the clinicians to recognise polyps using conventional colonoscopy (2).

A second study randomised 276 patients presenting for routine colonoscopy to NBI or conventional colonoscopy. After either NBI or conventional colonoscopy was carried out a subsequent examination with conventional colonoscopy was performed as the reference standard. The neoplasm miss rate was calculated against the reference standard and was similar for both techniques (NBI = 17/135 (12.6%) vs. conventional colonoscopy = 17/141 (12.1%). The miss rate for advanced adenomas was less than 1% (3).

Three studies were also included in this summary for assessment (4, 5, 6). All of them found that NBI performed equal to or better than conventional colonoscopy for the detection and prediction of the status of discovered polyps.

FUTURE STEPS

The majority of colonoscopes manufactured have the capability of performing either conventional colonoscopy or narrow band imaging. There may be a learning curve involved in the use of narrow band imaging which may see the slow introduction of this technique. If the polyp detection rate is higher using narrow band imaging compared to conventional colonoscopy, then further investment in this technique would be warranted. Therefore HealthPACT have recommended that this technology be monitored in 12-months time for further information.

Written by Adrian Purins, AHTA

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Continuous flow ventricular assist devices (executive summary)

The severe disparity between available donor hearts and the number of end-stage heart failure patients who require cardiac transplantation has resulted in the adoption of left ventricular assist devices (LVADs) which function as a bridge to transplantation. The randomised REMATCH trial has shown that LVADs confer significant survival advantage compared to medical therapy, and is therefore a viable option for ventricular support. Current LVADs are pulsatile devices, which utilises various moving parts to mimic normal physiological blood flow. This has major implications towards mechanical reliability, and mechanical failure has been shown to increase significantly over time. The use of pulsatile LVADs (P-LVADs) is also associated with high infection rates.

Continuous flow LVADs (C-LVADs) were developed as an alternative to P-LVADs, and has been touted as "next generation" LVADs with greater mechanical reliability complemented with a much smaller design, which translates to easier implantation. Despite some variability in the measured parameters between studies, the retrieved evidence indicates that C-LVADs support is mostly comparable to the haemodynamic and echocardiographic results achieved by P-LVADs. In addition, exercise performance and organ function parameters were comparable for both types of LVADs. However, there is evidence that improvements in organ function, although significant at first, did not persist up to the day of transplantation.

As expected, the use of C-LVADs resulted in significantly lower infections rates compared to P-LVADs. However, one study highlighted that C-LVAD support significantly elevated specific inflammatory markers, while others remained similar to P-LVADs. The reason for this remains unclear, and may be associated with the materials used to construct the C-LVAD. Meanwhile, studies examining neurological injury and neurocognitive functions revealed that both pulsatile and continuous flow LVADs achieved similar outcomes and do not appear to have adverse events towards the brain. One of the key concerns associated with the use of C-LVADs is the fact that the long-term implications of continuous blood flow remains unclear. Two of the retrieved studies revealed that vascular reactivity and pulsatility is compromised during C-LVAD support. Vascular impedence readings also revealed that C-LVAD support results in loss in vascular compliance, which indicates vascular stiffening.

The evidence available is generally supportive of C-LVADs and demonstrates that key outcomes are mostly comparable to P-LVADs. However, many questions remain unanswered. The long-term mechanical reliability of C-LVADs have not been adequately investigated, uncertainties regarding continuous flow support remains and the increase in specific inflammatory markers during C-LVAD support warrants further investigation.

Written by Irving Lee, ASERNIP-S

For a full reference list, see www.horizonscanning.gov.au

Other New and Emerging Technologies

The following additional technologies were considered by the Health Policy Advisory Committee on Technology (HealthPACT) in November 2008.

- HypoMon® for non-invasive device for the detection of hypoglycaemia in type I diabetics,
- Non-invasive pulse carbon monoxide oximetry for haemoglobin monitoring,
- Breast cancer diagnosis using ultrasound elasticity imaging,
- Electrochemotherapy for treatment of local malignant tumours by administration of chemotherapy drugs followed by electroporation.

The above technologies can be accessed on the following link:
http://www.horizonscanning.gov.au/internet/horizon/publishing.nsf/Content/prioritising-summaries-2007-2

- Surgisis® AFP™ anal fistula plug to reinforce soft tissue for repair in patients with anal fistula,
- Rheos® hypertension therapy system™ for patients with drug resistant hypertension,
- ProAct™ therapy for male stress urinary incontinence,
- Multi-catheter interstitial brachytherapy for early stage breast cancer in women,
- IntraLase® femtosecond laser for the creation of corneal flaps required for laser in situ keratomileusis (LASIK).

The above technologies can be accessed on the following link:
http://www.horizonscanning.gov.au/internet/horizon/publishing.nsf/Content/asernip-s-net-s-summaries-2

PRODUCTION NOTES

The ANZHSN Bulletin is published by Adelaide Health Technology Assessment (AHTA) on behalf of the Health Policy Advisory Committee on Technology (HealthPACT) and funded by the Australian Government Department of Health and Ageing.

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