Transplant news

10th Anniversary

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Editorial

Professor Alastair Millar
Editor

Exercise! Easier said than done; but an essential part of the pre- and post-transplant programme to prepare for the transplant, if severity of illness allows. Of course after transplant an exercise plan can only benefit as Dinky Cohen so comprehensively explains. This leads in to the following article where the importance of physiotherapy is highlighted not only for its obvious treatment and rehabilitation of lung, heart and muscles but also for empowering the patient to regain control of their battered bodies and restore to health both physically and mentally. Having a positive attitude is so important and goes a long way to winning the battle, as emphasised by Pule Mafojane and Letta Khambula physiotherapists at Wits Donald Gordon Medical Centre (Wits DGMC).

Jerome Loveland, head of paediatric surgery at Chris Hani Baragwanath Hospital recounts the story of the development of the Wits Donald Gordon Medical Centre Transplant Programme. This is indeed a remarkable success story and shows what good organisation, proper preparation, mentoring and a determined leadership can achieve against considerable odds. The interview with Russell Britz gives more insight into the mind and heart of this man who leads the team at Wits DGMC.

August or better termed 'Orgust' for the transplant community is the month set aside by the Organ Donor Foundation and all concerned with organ donation to raise awareness of the need for more organ donors and also an opportunity for all those who have received the 'gift of life' to give thanks. It is also a time for those who lost loved ones to reflect.

The transplant games is living proof, advertisement and re-affirmation of this 'gift of life' and the South African team can be very proud of their performance, once again bringing home a veritable store of medals. Congratulations! There is also a super collage of photos of the team and athletes in action. Congratulations also to Willie Uys, National Chairman of SATSA, for bringing the next games to Durban, South Africa. This will be a wonderful opportunity for us to celebrate and to advertise what organ transplantation can achieve in restoring a person to full physical and emotional health.

One of the not so pleasant side-effects of some of the immunosuppressive drugs is 'sugar' diabetes. Some have a predisposition and when burdened by steroids and the calcineurin 2 inhibitors of Tacrolimus and Ciclosporin may develop diabetes. Julian Jacobs a nephrologist and transplant physician from Cape Town tells us about new onset diabetes after transplant, NODAT and how best it is managed.

Production Editors: Ann Lake Publications: Ann Lake/Helen Gonçalves
Design: Jane Gouveia
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Enquiries: Ann Lake Publications
Tel: (011) 802 8847
Fax: 086 671 9397
Email: lakeann@mweb.co.za;
www.annlakepublications.co.za

Exercise and transplantation

Dinky Cohen
Physiotherapist
Johannesburg

Not one of us have looked at articles discussing health without being told how important it is to exercise. Most of us do get the message but find it such a bind to exercise that we just turn over the page and read about something that is much easier to carry out such as swallowing some pill that promises to cure all ailments. Let us now keep that exercise page open and read a little bit more. Maybe I can convince a few of you that, even though it is definitely not as easy as swallowing a pill , exercise can do a lot more for you.

Scientifically proven effects of exercise

- Improves the efficiency of the heart muscle - it has to work less to function better.
- Improves oxygen uptake of all muscles - we can thus do more using less oxygen.
- Assists the bone uptake of calcium - prevents osteoporosis.
- Releases substance i.e. endorphins into the bloodstream which contributes to a feeling of wellbeing.
- Improves the condition of the blood vessels which helps to control blood pressure.
- There are also a number of other unproven beneficial effects.

How exercise affects all of us

- We feel fitter. We can do more using less effort.
- Our bones do not fracture so easily.
- We have a greater sense of wellbeing.
- We generally feel much healthier.

Types of exercise to participate in

There are two definite types of exercise that we can participate in. The types of exercise are endurance and strengthening exercise. Both types of exercise are important but each produces a different effect. Once you have made the commitment to exercise, you must make use of both types of exercise to produce maximum benefit.

Endurance Exercise: This is exercising using repetitive movement of large muscle groups (i.e. arms and legs) over an extended period of time. Examples of these types of exercise are walking, running, cycling, rowing etc.

Endurance exercise uses repetitive movement of large muscle groups e.g. running or walking.

Strengthening Exercise: This makes use of resistance in the form of weights or gravity to improve the status of individual muscles.

How to exercise

Endurance exercise

Once you have decided that you are going to make the commitment to exercise there are certain things that you must think about:

1. The exercise must suit your own personal lifestyle. It is no use taking out an expensive gym contract and finding that you do not have the time or the finances to attend the gym on a regular basis. If that is the case it is better to participate in a more flexible exercise such as walking or cycling.
2. In order to produce the beneficial effects which we have discussed earlier, there are certain rules that you have to stick to, otherwise you will be wasting your time. You will also become despondent when you find you are not achieving the effects you had hoped for.
3. Perseverance is very important. Results are not always immediate.

Rules for endurance training

F – Frequency

must exercise at least 3 times a week (should your condition limit the amount you can exercise at a time, then you have to exercise daily.

I - Intensity

must stress your cardiovascular system to a certain extent (not overstress). How do we judge if we are doing this? Our heart rate (pulse) must reach a certain level while exercising. This level can be calculated by the following equation – 60% to 80% (220 – age). Should you have a pacemaker in situ or be on medication that slows you heart rate you must not exercise to a heart rate higher than 20 beats above your resting heart rate.

T – Time

must exercise for at least 15 to 20 minutes (at required intensity) 3 times weekly. According to the American College of Sports Medicine one can exercise for less time to start off with and gradually build up to the required time.

If you are not sure if you are exercising correctly, it is advisable to consult a physiotherapist who is experienced in exercise training to help you.

Exercise and transplantation

The above discussion has given you insight into he value of exercise and how to exercise. Should you be on the transplant list or should you already have had your transplant, exercise can only improve your condition.

What is the value of exercise on different transplants?

Liver

The liver is responsible for the protein metabolism within your muscles. Should your liver not be functioning correctly, this process will be affected. The belief exists that should these muscles be maintained in optimal condition, these effects could be minimised. After transplantation, protein metabolism definitely does normalise but without exercise, these muscles will still not reach their full potential.

The liver also controls calcium uptake into the bones. As we saw earlier, exercise aids the uptake of calcium. Here, it will also be advisable to use exercise to minimise osteoporosis.

Kidney

The kidney also controls protein metabolism into the muscles. As with the case of liver disease, it is also advisable to keep your muscles in a good state.

In kidney failure, oxygen uptake into the bloodstream is affected. Muscles that are not exercised regularly require more oxygen. An imbalance between oxygen available and oxygen required leads to your finding it more and more difficult to exercise. Keeping muscles active, results in the muscle needing less oxygen.

Heart

The heart is a muscle, it thus requires exercise as any other muscle does.

Conclusion

We hope this article will encourage all to consider exercise in the same light as the essential medication to ensure optimal functioning of your new organ.

Should any of you feel that you need to discuss your own programme with a physiotherapist, feel free to ask your transplant team to refer you to us.

Depression and physical rehabilitation in transplant patients

Pule Mafojane & Letta Khambula Physiotherapists treating organ transplant patients at Wits University Donald Gordon Medical Centre Parktown

Organ transplant surgery is a major medical procedure that requires both mental and physical recovery following surgery, kidney, liver and kidney-pancreas patients benefit greatly from acute inpatient physical rehabilitation which is done in the Intensive Care Unit (ICU), High Care Unit and follow up treatments in a normal medical ward. Physical rehabilitation focuses in encouraging demotivated patients due to prolonged fatigue, fear of the unknown and who are depressed due to organ failure illness into gaining strength and flexibility and to integrate them into normal activities of daily living post-surgery.

Physiotherapy treatments start day one after surgery from when patients are still in mechanical ventilation to prevent the following:

- Lung collapse which may later develop into chest complications and infections such as pneumonia.
- Muscle atrophy, joint stiffness and decreased blood circulation which may form dangerous clots in blood vessels.
- Swelling, delayed wound healing from abdominal surgical incision and other major medical complications which may cause death.

Pain is the biggest factor that demotivates patients. Patients get depressed and often do not understand why they must start with physiotherapy immediately after surgery. Fortunately in treatment programme, physiotherapists educate patients pre- (integrated with organ failure clinics) and post-surgery on the following topics:

- Postural improvement.
- Chest physiotherapy with deep breathing exercises using modalities such as Incentive spirometer.
- General body exercises targeting weak muscles which vary from patient to patient, and increasing exercises from as little as getting out of bed, sitting in a chair and climbing stairs.
- Integration into activities of daily living focusing on the socio-economic status of patients such as hobbies and the type of work they do.

Transplantation at the Wits-Donald Gordon Medical Centre:
How it all came about

Dr Jerome Loveland
Head, Department of Paediatric Surgery
Chris Hani Baragwanath Academic Hospital
University of the Witwatersrand
and
Transplant Surgeon
Wits Donald Gordon Medical Centre
Johannesburg

The Wits Donald Gordon Medical Centre has rapidly established itself as home to one of the leading centres in transplantation in Southern Africa, offering a broad spectrum of solid organ transplant solutions.

Why the "Private Sector"?

Professors Myburgh and Du Plessis established renal transplantation at The University of the Witwatersrand in the 1960's and the unit was also transiently involved in liver transplantation during its inception in the late 1980's. The division ran a highly successful renal programme in both the provincial and private sectors for many years, however the ambition to add liver transplantation to the ambit of the unit was not supported by National Government who did not see the need for a second liver transplant unit in the academic sector in South Africa, feeling that the unit at Groote Schuur Hospital in Cape Town was adequate. Fortuitously, the university's ambition to expand coincided with the establishment of the Wits Donald Gordon Medical Centre (Wits DGMC), a public private partnership between the University of the Witwatersrand and the private healthcare sector, which was identified as an ideal environment to launch Johannesburg's liver transplant unit. Initially catering only for private patients (a strong criticism), the first liver transplant was performed in August 2004, and after much negotiating, both funded and indigent state patients are currently listed on a common waiting list, thereafter transplanted according to immunological compatibility and severity of disease. Under the leadership of Professor Russell Britz, and mentored by The Transplant Unit at the University of Nebraska Medical Centre, Omaha, USA, the unit has subsequently grown exponentially, developing into a highly successful programme that offers a near complete spectrum of transplant solutions to an ever-increasing recipient pool.

What organs do we transplant?

Since its inception, the unit has transplanted over 3400 cadaveric and related living donor kidneys, 165 cadaveric livers (including 29 children), 71 simultaneous kidney pancreata and has performed 40 Laparoscopic related living donor renal (RLD) harvests.

So the surgeon is king?

On the contrary! Whilst public opinion is generally that transplantation is a purely surgical endeavour, the surgery is of course an essential event, but is just one component of an intricate process carried out by an enormous team of dedicated staff. It is this team that proudly defines the Wits DGMC. Comprising donor and recipient transplant co-ordinators, psychologists, physiotherapists, allied medical professionals and an enormous administrative staff, the team works continually on education of the public, donor recruitment and management, diagnosis and care of end-stage disease, and work up for the transplant itself. Pre- and post-operatively, a highly organised in-hospital component takes over, directing the medical and nursing care of the recipient. From the medical perspective, once again an essential yet less publicised aspect of any transplant unit are the numerous ancillary, but equally, if not more important aspects of medical care including renal replacement therapy (dialysis), obligatory vascular and peritoneal access for the former, management of endocrine complications of chronic renal failure and diabetes, as well as the multi-disciplinary management of end stage liver disease.

Who is watching us?

Additional factors that contribute to any unit's success are data collection and analysis with independent and external audit of results, allowing one to identify problems and institute remedial action where necessary.

What challenges do we face?

In the absence of related living donors, recipients rely on deceased donors as their source of organs, and this remains the biggest limiting factor in our programme. The organ itself is the ultimate "scarce resource"! Education of the public around the importance of organ donation remains an important focus in an attempt to produce a larger donor pool, particularly as South Africa runs an "opt in" as opposed to "opt out" donor policy, as in Spain, where all residents are donors unless otherwise specified! Another current challenge that we are facing is the provision of specialist paediatric hepatology to our pre and post liver transplant patients, as well as paediatric intensive care in the immediate post-operative period. The lack of specialist personnel in these two areas of expertise has currently severely curtailed our paediatric liver programme, a situation that we are desperate to remedy.

What new projects are we undertaking?

Current plans include expanding our unit to include non-heart beating donors, living donor liver transplants (aimed initially at the paediatric population) and broadening the pancreas programme, looking at using a deceased donor pancreas with a simultaneous living donor kidney graft, pancreas after kidney and pancreas alone. In addition we are the first centre in South Africa to develop and institute a formal 2 year postgraduate surgical "sub-specialty" training programme, covering all aspects of solid organ transplantation. We continue to work actively on the above projects.

What defines our success?

In conclusion, what defines the success of this unit is the smooth functioning of a large and diverse team, all of whom are experts in their respective fields. Probably our greatest attribute though is the fact that these skills are broadly distributed to more than a single individual in a particular discipline, allowing all aspects of the unit to function seamlessly in a continuum, allowing a deserving patient population continuous access to the organs that they require.

Interview with a transplant surgeon

Professor Russell Britz

How did you come to be a transplant surgeon?

I qualified as a surgeon in 1991 and continued to work at Johannesburg hospital where my duties included transplantation. I sub-specialised as a vascular surgeon. As the nature of vascular surgery changed to less surgery and more radiological, minimally invasive procedures, my interest shifted to transplantation.

Describe your academic path leading up to your present position

I commenced medical school at Wits in 1974 and qualified in 1979. Internship in 1980 was at Natalspruit Hospital followed by military service and a year of anaesthesia, during which I gained the diploma in anaesthesia. I took a junior lectureship in the department of anatomy at Wits ('Table Doctor') to assist my studies in anatomy, physiology and pathology. Over the next 7 years I trained in general surgery at Hillbrow and Johannesburg Hospitals. I joined the vascular surgical unit a year later and registered as a vascular surgeon after 3 years. I worked in this unit for 14 years before shifting to the transplant unit (and endocrine/breast/head and neck unit that is combined with the transplantation at Johannesburg hospital). In total 19 years of study or training.

How do you make a decision on a transplant recipient and how is that person informed

The patient has a set protocol of investigations to complete in order that a multidisciplinary team may have the detailed medical information required to decide whether the patient will benefit from transplantation. This workup includes an assessment of the patient's physical and mental fitness for transplantation. Once the panel has made a decision, the patient is informed by his physician and the transplant co-ordinator.

What makes up the whole transplant team?

A multidisciplinary team of surgeons, nephrologists, hepatologists, endocrinologists, cardiologists, pulmonologists, intensive care physicians, pathologists, psychologists, social workers, dieticians, physiotherapists, dialysis technicians… and the infrastructure required to provide 24 hour, lifelong care post-transplant. All are indispensable in the chain of care.

Describe the build up and preparation of transplantation.

There are 2 scenarios. A living donation of a kidney that entails the medical preparation of the donor and recipient with a planned date set for the transplant; and a deceased donor organ transplant that may occur at any time. Recipients waiting for a deceased donation will have 6 months warning of a pending call up. This follows an up to 5 year wait from the time of first listing.

What is required of the transplant team before the operation?

First, familiarity with the patient's medical condition; it is important to ensure that all information has been collected prior to the call up. It is critical for the team to be available to do the work 24 hours a day, 365 days a year.

What is the most difficult thing about your job?

Dealing with organs that fail to function once implanted.

What are the follow-up requirements of a transplant surgeon as regards the patient?

Surgeons are most involved in the first 6 months post-transplant when the potential for surgical complications are greatest. Thereafter, they are always available to manage any surgical complication that may arise when referred by the attending physician who manages the immunosuppression.

What are your feelings before, during and after the operation?

More questions than feelings – Is the donor organ suitable? Is the recipient suitable for the organ? How ill is the recipient at that time? What are the anticipated time spans between donation and implantation? Who is the anaesthetist? Is the ICU arranged? Similarly, during the operation: What difficulties does the current organ pose for implantation? What difficulties will the recipient pose more than usual? Is the post-op care sorted? Is the operation proceeding according to plan and in the allotted time? Afterwards, I'm slightly on edge, trying to anticipate any possible complication.

What are your feelings after a successful operation and the patient has been given a new lease in life?

Satisfied that the whole team has performed as intended and that the goal of transplantation has been achieved. Renewed will and energy to do it again. Caution of complacency.

Which of your transplantations do you regard as being your most rewarding and most unusual?

Most rewarding have been those where opinion has been that the patient cannot be salvaged or where logistic challenges have appeared insurmountable. Most unusual was the successful transplantation of a pancreas (the organ I most disliked working on as a trainee) into a patient fetched from Hospice.

Can you describe a typical day in your busy life?

Up at 6am. Work on average a 10-hour day. Consulting, operating, administration, teaching, while waiting for a donor call.

What other demands are made on your time?

Managing the general surgical ward at Johannesburg hospital, giving lectures and talks, dealing with DOH and revising documents, devising fair allocation systems, collection of data and organising conferences.

What are your interests and hobbies and what do you do for relaxation?

Reading. Riding (motorbike). Study of the universe and nature of beings and things. Scientology.

What advice can you give patients on dialysis?

Get on the list for transplant as soon as possible, maintain your general health, don't despair with the long 5-year wait, it will end.

Advice to patients waiting for a transplant donor?

Find a willing living donor if at all possible.

Advice to someone ready to go in for a transplant?

This is your best option and chance at a normal life. Every effort has been made to make this a success.

Advice to organ transplant recipients?

Do whatever it takes to look after the gift of life someone has given you.

ORGUST - Organ Donor Month

Samantha Volschenk
Executive Director
Organ Donor Foundation, Cape Town

The Organ Donor Foundation renamed August "Orgust", in honour of Organ Donor Month. Under the theme Save Seven Lives, Orgust served to highlight the statistic that one person saves seven lives when they register as an organ donor.

On Monday, 1 August, RadioSonderGrense (RSG) supported the Organ Donor Foundation with a signathon to launch Organ Donor Month. An outside broadcast was hosted in the reception area of the Netcare Christiaan Barnard Memorial Hospital in Cape Town where recipients, patients awaiting transplants and medical staff involved in transplantation were interviewed. RSG also promoted organ donation throughout the day on their radio station. We are extremely grateful for their continued support of the Foundation.

On Wednesday 10 August we were pleased to have Springbok rugby player, Jean Du Plessis and Sharks vice-captain, Stefan Terblanche, visit Ethekwini Hospital and Heart Centre to help highlight Organ Donor Month. The rugby players met three young patients who are waiting for heart transplants, as well as two recipients, who received successful heart transplants a few years ago. (Both these recipients, Sannie Liebenberg and Matthew Moffatt, represented South Africa at the World Transplant Games in Götenborg, Sweden in June 2011.) As well as chatting to the recipients and the awaiting patients and their families, Du Plessis and Terblanche also met hospital staff and members of the hospital's Transplant Team. Newspaper journalists reported on the meeting and published articles in the local press, highlighting the need for people to consider becoming organ donors.

Organ Donor Tribute days were held in Cape Town and Gauteng to pay tribute to organ donors and their families. The Cape Town Organ Donor Tribute Day was held on Sunday 21 August 2011 at St George's Cathedral at 3pm; while the Gauteng Tribute Day was held on Thursday 25 August 2011 at Fourways Memorial Park at 10:30 am.

The Gauteng service was attended by donor families, transplant recipients and their families, doctors, medical and hospital staff and the media. Kareshnee Naicker was the MC for the day. The service began, with the children of Marang House singing a few songs and a prayer read by one of the older children. This set the tone for the rest of the service. A very heart-warming talk was given by a donor family, who lost her husband earlier this year. Speeches were also made by a kidney, cornea, double lung and heart recipients. The service culminated with the donor family and a recipient family lighting a joint candle.

After the service a dove releasing ceremony was held at the rose garden and each person was given a balloon to release into the sky. All attendees were then invited to light a candle and spend a few moments at the memorial site.

On Friday, 26 August the Organ Donor Foundation hosted a Corporate Civvies Day called the "Mad Hatters Day", where companies were asked to purchase a sticker for R10 and employees were encouraged to wear their favourite mad, wacky hats to work.

The Organ Donor Foundation would like to thank:

- All the Transplant Co-ordinators and medical staff who assisted us with awareness and promotions during August
- The South African media for all their wonderful media coverage during August
- All the corporates and individuals who promoted organ donation on our behalf or participated in our Mad Hatters Civvies Day
- All the volunteers and recipients who assisted the Foundation during the month

The result of Orgust was a phenomenal 300% increase in the number of people registering as organ donors during the month. If you are interested in becoming an organ donor, please call Toll Free: 0800 22 66 11 or visit www.odf.org.za.

Left: Rugby players support Organ Donor Month
Top Left: Mad Hatter's Civvies Day - National Renal Care Green Acres Hospital staff
Top centre and right: Gauteng Tribute Day
Bottom right: Gauteng Tribute Day - Doves were released in honour of the organ donors

XVIII World Transplant Games – Götenborg, Sweden

Team South Africa consisted of 47 athletes and 43 supporters and for the first time we had three children under the age of 11 years. The Team returned with 48 medals – 17 each of Gold and Silver and 14 Bronze.

Willie Uys
National Chairman
SATSA

The weather wasn't conducive to outdoor sport but our athletes performed well with Daniel Matsoso winning Gold in the 5km Road Race and the 1500m and a Bronze in the 800m. Stephan Van Den Berg won a Gold in Discus and Bronze in Tennis singles & doubles (with Gawie Marx) and in Javelin. Constance Sithebe won Gold in the Ball-throw and Silver in the 3000m Race Walk.

Our athletes were well supported by the non-participants who sang and danced their way around the pavilions, streets and hotel. It was wonderful to share a hotel with the Irish Team who also loved singing and this made for great camaraderie.
Our three children, Phamela Mavundza (Gold), Thato Makhubedu (Silver) and Johan de Jager (Gold & Bronze) were great in inspiring the rest of the Team.
Our squash athletes really excelled as all six of them won a medal. Catherine De Beer, Anil Balmakund and Edward Ormond won Gold; Alice Vogt and Henry Van Aswegen won Silver while Kobus Weideman won Bronze.

In swimming we had medal winners in Matt Moffatt (Gold & Bronze) Tersia Smit (3 Silver) and Harold Moore (2 Silver & Bronze). Gerhard Van Dyk won a Silver medal in the Men's Virtual Triathlon – 400m swim; 5km Road Race and 20km Cycle Road Race.

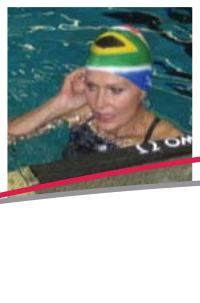
In golf our players found the going tough on the Hills Course. Heilie Uys won gold and three of the men were just out of the medals in fourth place. Heilie also won another Gold (Ball throw) 2 Silvers (Discus & Javelin) and Bronze in Shot Put.

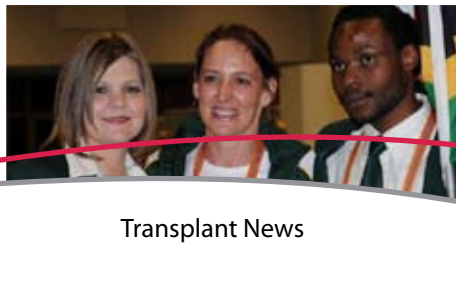
Kosie Laubscher and Lourens Schultz had strong opposition but each won a Gold medal in Discus & Javelin respectively. Lourens also won Silver in Discus and Kosie Bronze in Shot Put.

An outstanding performance came from Johan Kleingeld who won Gold in Badminton Singles and Doubles with Anton Grobler and Nkanyesi Biyela who again made the Gold his own in the 5000m Race Walk and also Silver in Ball Throw. There were also medals won by Nombeko Rwaxa in 100m and Ball Throw and Sakkie vd Westhuizen who won Silver in the High-jump.

The Team came back fully motivated to improve on this showing in the World Games that will be hosted in Durban in 2013.

Our thanks to all the sponsors and supporters.





Can I avoid Diabetes Mellitus (DM) after transplant?

Dr Julian Jacobs
Nephrologist and Transplant Physician
Christiaan Barnard Memorial Hospital
Renal Transplant Division
Cape Town

There has been great improvement in the outcome of patients receiving a kidney transplant, as a result of the advances in the surgical techniques and immunosuppressive medication.

The transplanted organs can last much longer and the patient's quality of life has also improved.

New Onset Diabetes Mellitus after Transplant (NODAT) has however been reported with an increasing incidence. This can harm the long-term lifespan of the transplanted organ and can put one at risk for other conditions such as heart attacks and strokes, if not properly managed.

Definition of NODAT:

- Symptoms of diabetes mellitus + random glucose > 11mmol/L or
- Fasting glucose >7 mmol/L or
- 2-hour post-prandial glucose > 11mmol/L

What is the natural history of NODAT?

There are many similarities with type 2 DM as individuals may be asymptomatic for months before the disease clinical manifests. Sometimes NODAT may normalise without need for specific treatment.

There are two distinct phases:

1. initially during the first 6 months post-transplant, and
2. progressively over time thereafter.

Who is at risk?

- Patients generally older than 40 years
- Ethnic backgrounds as certain populations have an increased risk for DM
- Family history of DM in first- degree relatives
- Obesity
- Hepatitis C status appears to be more associated with NODAT
- Specific immunosuppressive therapies
- Impaired glucose tolerance before the transplantation

Immunosuppressive therapy

1. There is an association between the accumulative dose of steroids received and NODAT. Reduction of Prednisone to average 5mg per day does reduce the risk.
2. Ciclosporin, Sirolimus, and more prominently Tacrolimus have been associated with increased risk for NODAT. Dose reduction of Tacrolimus has shown to improve glucose tolerance.
3. No increased risk is seen with Azathioprine, Mycophenolate Mofetil (MMF) or use of the newer biological induction agents.

Management options

1. Pre-transplant screen with medical history and fasting glucose. Counselling to include the importance of lifestyle modification with weight control, appropriate diet and engaging in a sensible exercise programme.
2. Individualisation of immunosuppressive therapy with steroid-sparing or rapid steroid withdrawal options can be considered for patients at risk for NODAT.
3. Ongoing monitor of glucose after transplantation and even repeat use of the glucose tolerance test is advised.
4. Medical management of NODAT is with the usual oral anti-diabetic drugs, but up to 40% of patients may eventually require use of insulin therapy.
5. The aim of the treatment is to maintain normoglycemia and avoidance of long-term complications.