



Little Hearts Matter



Heart transplantation

A guide for families



Contents

Introduction	Page 4
Who needs a transplant?	Page 5
The heart transplant story	Page 6
How long do heart transplants last for?	Page 7
Why don't transplants last as long as normal hearts?	Pages 8 - 9
What is the quality of life after a transplant?	Page 10
How does a child get on the heart transplant list?	Page 11
The transplant team and transplant assessment	Page 12
How long is the wait for a transplant?	Page 13
How are children kept alive whilst waiting for a transplant?	Pages 14 - 15
Can the heart recover?	Page 16
How are we contacted when a heart is available?	Page 16
What about the donor?	Page 17
The transplant operation	Pages 18 - 19
What happens after going home?	Page 20
Commonly used post-transplant medications	Pages 21 - 23
Oliver's transplant journey	Pages 24 - 31
Further information	Page 32
Notes	Page 33
Acknowledgements	Page 34

Introduction

The treatment for children with single ventricle heart disease has evolved over the last 20 years.

Doctors are now able to offer surgery and medical care that supports the half a heart that each child has to give the children a good, though not perfect, circulation. When one pump is doing the job of two, the heart will gradually tire, leading to increasing heart failure and ultimately the need for new treatment options. Transplantation, with all its challenges, is one of these options.

This booklet provides an introduction to transplantation. The aim of the publication is to help anyone facing this treatment to gain a greater understanding of the assessment process, surgery and an overview of the risks involved. It will not give you an answer to every question you have about your child. These in-depth questions will be answered by the transplant team during transplant assessment.

Reading this booklet may be difficult for some parents because transplant is an emotive subject. If you would like to receive support or further information please don't hesitate to contact the LHM team on 0121 455 8982.

Who needs a transplant?

Transplants are done in children for two main reasons - either the child was born with a healthy heart which developed a problem in pumping blood around the body or the child was born with a heart problem which could not be fixed by regular surgery.

Problems can develop in a previously healthy heart because of a severe viral infection or a genetic defect in the way the heart muscle is programmed to work.

Children born with some serious heart defects, e.g. Hypoplastic Left Heart Syndrome (only one main pumping chamber instead of two), can often benefit for many years from surgery but eventually the valves may leak (back flow), the heart muscle may become worn out or the lung artery pressure may be too high for the blood to be able to flow into the lungs and the circulation gradually fails. If these problems become severe the children may be better treated with a transplant.

The heart transplant story

The history of transplantation can be seen as traumatic and emotional. The bravery of the children who have gone before has allowed for the advances we see today.

The first human heart transplant was undertaken by Professor Christiaan Barnard at Groote Schuur Hospital in Cape Town, South Africa in 1967. He transplanted the heart of Denise Darvall, who was sadly knocked down by a drunk driver just outside the hospital, into a 50-year-old man - Louis Washkansky. The first baby to receive a heart transplant underwent surgery just three days later in New York. Sadly the baby passed away within hours and Washkansky after three weeks.

However, several units around the world were also ready to undertake transplants and so over the next two years over one hundred procedures were performed. Unfortunately most recipients lived for only a short time as the heart was rejected by the immune system. The immune system is very powerful and designed to seek out and destroy things that shouldn't be in our bodies - mostly these are germs but the immune system also recognises the transplanted heart as "foreign" and tries to reject it. Back in the 1960s and 1970s the drugs available to prevent rejection were not very good and as the results were so poor, transplants were effectively abandoned for a decade until a new and much better drug called Ciclosporin was discovered.

The new era of heart transplantation thus began in 1979 and since then there have been over 100,000 heart transplants in adults and 10,000 in children around the world. In Europe the first successful heart transplant in a baby was performed at Freeman Hospital, Newcastle in 1987 and one year later Great Ormond Street Hospital in London began their transplant programme. These remain the two children's transplant centres in the UK. Each centre undertakes 15-20 transplants a year and together they have performed more than 600 transplants, making them amongst the biggest children's heart transplant centres in the world.

How long do heart transplants last for?

Heart transplants are a life-saving treatment but sadly the transplanted heart doesn't last as long as the natural heart.

The International Society of Heart and Lung Transplantation (www.ishlt.org) keeps a registry of the children's transplants notified to them from all around the world. Of all the 10,000 children with heart transplants in the ISHLT Registry, half were still alive 15 years after their transplant.

The results from individual centres may be better than the average - for example, transplanted children at the Freeman Hospital live on average for over 20 years. Whilst this extra time to live is to be valued, much research is being undertaken to improve the situation still further.

Why don't transplants last as long as normal hearts?

There are several reasons why a transplanted heart does not last as long as a normal heart: the children have to survive the transplant operation and the recovery period; despite better medicines, rejection can still occur and may not respond to treatment; additional anti-rejection medication is necessary in the first few months (as rejection is more common then) and so this is when the immune system is at its weakest and serious infections can occur. On average, of ten children undergoing a transplant, eight will still be alive after one year but one or two will have died either at the time of transplant, in the intensive care unit afterwards or because of rejection or infection in that first year.

The medicines we give the children are now much better than the older medicines but they still have side effects that can affect some children:

-  Some medicines gradually reduce the function of the kidneys. Usually this doesn't affect the children but is noticeable on blood tests. For a few, however, many years after transplant, the kidney function may become so poor that kidney dialysis or a kidney transplant becomes necessary.
-  As the medicines weaken the immune system, infections can be more frequent and take longer for the children to get over. This is more common in small children as they haven't yet met many of the germs that older children already have some resistance to.
-  Another natural function of the immune system is to destroy cancer cells that the body makes from time to time. It is less efficient at doing this after a transplant and so cancers

are more common than in other children. Fortunately most of these cancers can be successfully treated.

Further information on medications after a transplant can be found on pages 21 to 23 of this booklet.

However, the main reason why the transplanted heart doesn't last forever is that over time the coronary arteries (blood vessels that feed blood and oxygen to the heart muscle itself) become blocked and the heart muscle stops working - usually gradually, but occasionally suddenly. This problem, often called chronic rejection, is common to all organ transplants - heart, liver, kidney or lung and none of them last forever. Over the years treatments have improved a little but the main problem hasn't been solved.

At present the only solution is a re-transplant. A re-transplant cannot be promised, any more than a first-time transplant due to a lack of donors, but if possible it will be undertaken.

In the future we hope that better treatments will become available and that the children who have recently received a heart transplant will benefit from tissue engineering, stem cell treatment or advances in artificial pump technology.

What is the quality of life after a transplant?

After a transplant children are able to do most normal things - play with friends, go to school, have pets, join in sleepovers, travel abroad on holiday and have fun.

There are some things of course that are not normal. The children have to take medicines morning and night to prevent rejection occurring, they need blood tests to check that they are on the right amount of medication - not too much and not too little - and they need clinic check-ups to make sure their heart is working well.

The frequency of check-ups varies - in the beginning it may be every week but as time goes by the visits become less frequent and for some it is just four times a year.

Some children may have difficulty concentrating - this is probably because they were very ill before and around the time of transplant and because of the medications they need afterwards. A small number also experience psychological difficulties. However, most of the children are able to do well at school and take part in lessons, and many have gone on to university. Furthermore, most children can participate in physical exercise in school and at home - they tend to be better at the short-burst activities rather than those that require a lot of stamina (for example, cross country running). Many take part in the annual Transplant Games which help increase confidence and self-esteem and are a great opportunity to have fun and meet up with other transplant families. As the children become adults they can work in most jobs and go on to have children themselves if they wish.

How does a child get on the heart transplant list?

Once a child is showing signs that their heart is failing to do its job properly their medical team will need to decide what treatment options are available to give them a better quality of life for longer.

If they decide that it is time to consider the transplant option they will refer them to one of the two children's transplant centres in the UK. The centres will then make arrangements for an assessment to be made - this is usually over two to three days as an inpatient when all the previous information known about the child is reviewed and further blood tests and scans are undertaken as needed.

This information is required to see if a transplant is necessary, how quickly it is required and how the risks can be minimised. The assessment gives the transplant team a chance to get to know you and your child and most importantly allows time for you to get as much information about transplant as you want or need.

Once it is decided between you and the transplant team that transplant is the best option then your child will be placed on the transplant list. There are two lists in the UK - urgent and routine. Each has set rules that need to be met but in general terms the urgent list is mainly for children who are too poorly to leave hospital whilst the routine list is for those who can wait at home. Currently, however, very few children on the routine list receive transplants as there are always more children waiting urgently in hospital and not enough donors to go around.

Sadly this means that to have a realistic chance of transplant some children have to wait until they are so poorly they have to be in hospital to get on the urgent list. When a donor heart becomes available it is offered to the first suitable child on the urgent list, taking into consideration their size, blood group and any antibodies they may have against the donor organ, regardless of which hospital they are in.

The transplant team and transplant assessment

When you are sent to a transplant centre for assessment and through all transplant care you will be looked after and treated by the transplant team.

The team is made up of transplant cardiologists and surgeons, specialist nurses, psychologists, play specialists and transplant co-ordinators (who co-ordinate the donation and retrieval of any organs, support the family and generally organise the transplant process).

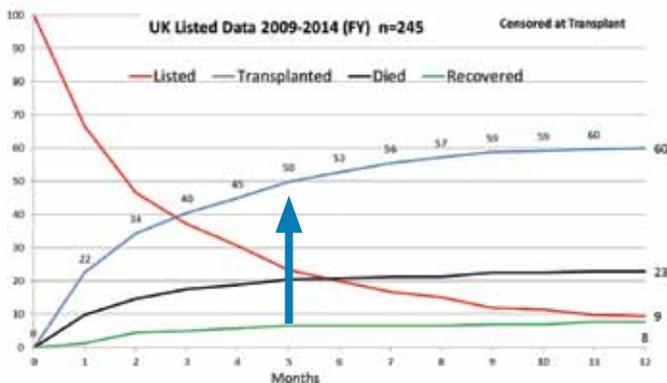
This team works together to make families feel comfortable, explains the stages of assessment and treatment and, after transplant, co-ordinates ongoing care.

Transplant assessment offers children, young adults and their families an opportunity to seek answers to questions about what transplant means for them. All decisions about transplantation will be taken as a team - doctors, nurses, psychologists and the family.

How long is the wait for a transplant?

As there are not enough donors for all the children most have to wait for their transplant. On average the waiting time is five months and sadly around one in four children die whilst waiting for a transplant.

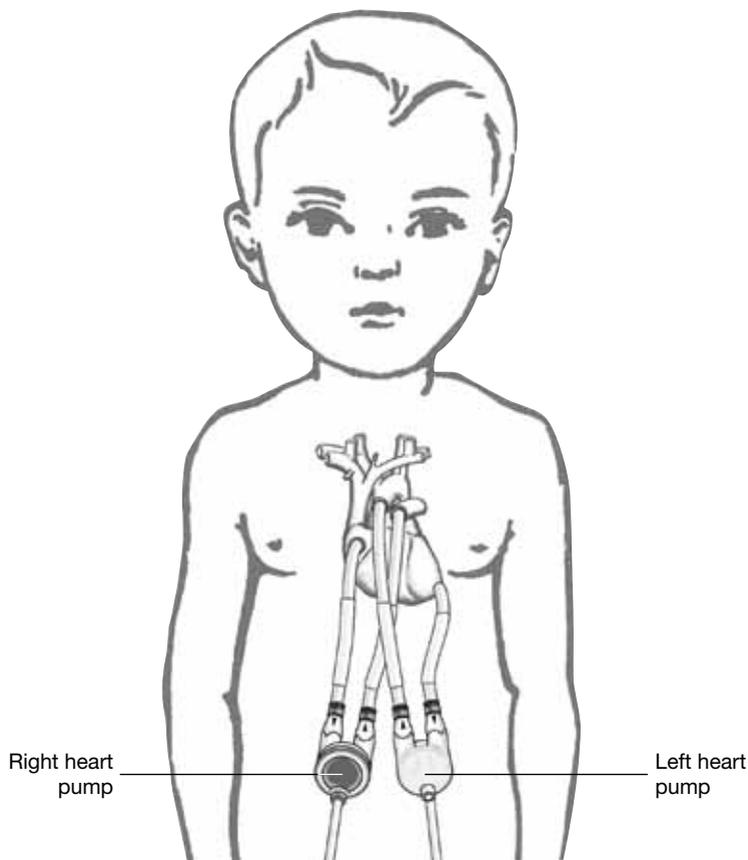
The graph shows what happens to 100 children listed for transplant in the UK. At time zero 100 children are on the list, by one month 78 are still listed, 22 have received transplants, ten have died but no child's heart function has recovered. By one year nine are still on the list, 60 have received transplants, 23 have died and eight have recovered. The arrow points to the time (5 months) when half of those listed have had a transplant – i.e. the average wait is five months.



However, for any one particular child the length of time waiting for a transplant varies depending upon their size, blood group and whether or not they have developed antibodies against potential donors (HLA antibodies). Children are not born with HLA antibodies against other people's organs but can develop them if they have had heart operations in the past, blood transfusions or some types of infections. These are the types of technical issues the transplant assessment looks at and tries to overcome in order to minimise the risks.

How are children kept alive whilst waiting for a transplant?

Keeping the children alive and well whilst they wait for a transplant can be very challenging - especially for children with single ventricle circulations. Some are able to manage with medicines but others need medication given directly into their veins to keep them alive. If these are not enough to help the circulation then the support of a mechanical heart might be needed.



Mechanical hearts or pumps are very good for children with a two ventricle circulation but do not work as well for those with a single ventricle. As with all treatments this type of treatment has complications.

One of the most common pumps used, especially in small children and babies, is the Berlin Heart (see picture). The pump has two pipes (cannulae) that take blood out of the heart, pump the pressure up and then two cannulae to return the blood to the lungs (right heart pump) and body (left heart pump). If the right heart is undamaged only a left heart pump is necessary. The pipes come out from under the rib cage and the main complications are bleeding, infection and blood clots. Clots occur in up to one in three children despite the use of blood thinners and are especially worrying as clots may become loose and travel to the brain causing stroke.

A different type of pump called Heartware is available for some older children and can be implanted inside the chest although a cable still needs to be passed out of the body and attached to the power supply (battery or mains) and controller. This system is good enough for some children to be managed at home. In the future we expect these pumps to become smaller and easier to use.

Can the heart recover?

Not all hearts can recover but some may, for example, if damaged by a virus. Even if the recovery is not complete it may be sufficient to avoid transplant for the time being. Delaying or avoiding transplant altogether is obviously preferable provided the child's own heart function recovers enough to keep them well and active.

How are we contacted when a heart is available?

Once a child has been accepted for a transplant the transplant team at the transplant hospital will explain the next steps, give parents contact details and keep in touch. It can be a stressful time waiting for a heart to become available so the transplant nurses and co-ordinators will help to support families as much as they can.

When a suitable heart becomes available the transplant team will get in touch if a child has been able to wait for their heart transplant at home. Parents will be contacted on their mobile phone or, occasionally, via a bleeper to ring the transplant hospital. Whilst there is only a four-hour window to remove a heart and transplant it into the patient the transplant team will know of a possible donor some hours before and so make arrangements at that time for the child to come to the hospital in plenty of time.

What about the donor?

Of course without donor families no one could receive a transplant - it is such a bitter-sweet gift as to give a donor heart means that someone in their family has died. However, the donor families often say that the only comfort they get is knowing their loved one has saved lives. Transplant families often wish to thank the donor family and can write a letter to them. The transplant co-ordinator can advise and facilitate this process as it is obviously a difficult letter to write. Occasionally donor and recipient families wish to meet and this may be possible to arrange.

One way everyone can help is to sign up to the NHS Organ Donor Register, tell their families their wishes and encourage their family and friends to do so too - it truly is the greatest gift anyone can give.

The transplant operation

The transplant team usually gets several hours warning of a possible donor. A team is sent to inspect the heart and, if it is suitable, then it is removed and brought to the transplant unit.

There is a four-hour window from taking the heart from the donor to implanting it into the child. The recipient transplant co-ordinator manages the whole process, ensuring the donor and the recipient medical teams work seamlessly together.

The child is taken to the operating theatre before the donor heart arrives as it takes some time to remove the old heart - the main veins and arteries are cut through and the old heart removed with the child being kept alive with the heart-lung machine as for any other heart operation.

Once the donor heart arrives it is connected by stitching together the veins that bring blood back from the body and lungs, and the main arteries that take blood to the lungs and body (see diagram).

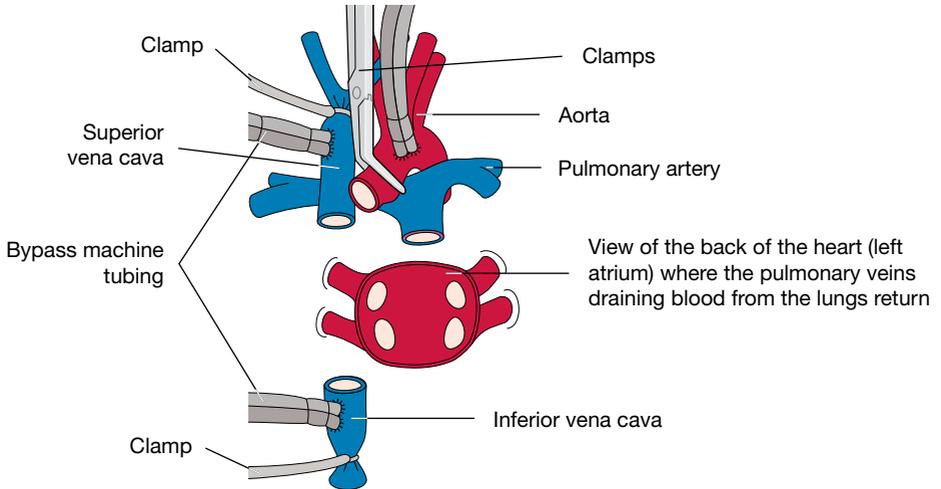
Although children with single ventricle circulations often have very different anatomy the surgeons are very skilled and with proper planning can connect in the new heart. The old heart is sent for pathological examination. The transplant operation takes several hours to complete. Afterwards the child is brought back to the intensive care unit to recover.

Recovery, with the exception of the additional transplant medications, is very similar to any child recovering from an open heart operation. The period in the intensive care unit is usually a few days to weeks, depending on how poorly the child was prior to the transplant.

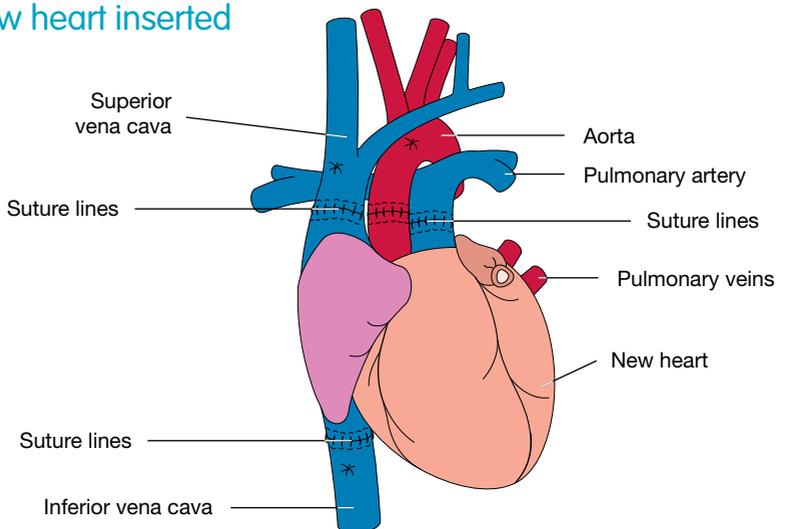
Once the child has recovered sufficiently they are able to go to the heart ward. To prevent infections, visiting by those other than immediate family is restricted. On the ward whilst the child is recovering a teaching programme is put in place so

that parents/carers gain confidence in managing the transplant medicines, and learn how to look out for rejection and the other complications that can occur.

The old heart removed



The new heart inserted



What happens after going home?

Once the child has recovered and the family are familiar with the transplant system then they can go home. It can still take time to fully recover and most children stay off school until three months after the transplant. The number of medicines is often quite large initially but after three months this is usually reduced and may be less than the number of medicines the children took before transplant. As rejection is possible any time after transplant these medicines need to be taken for life.

Clinic visits are frequent at the heart transplant unit at first. The heart is monitored by blood tests, scans and sometimes by taking a small piece of the heart muscle away at a cardiac biopsy (similar to a cardiac catheter test) usually under an anaesthetic. There is also an annual “MOT” visit where more tests may be undertaken. Once the recovery is established there will be shared care between the transplant unit and the local cardiac team.

Life after transplant is very different for children who have never been ill before but is not so different for children born with a serious heart problem who are used to taking medications and hospital check-ups. It brings its own challenges and rewards but most children have an active, fulfilling life.

Commonly used post-transplant medications

All children will be on some medications (usually at least twice a day) following cardiac transplant with the medication tailored to the individual. It is important that doses of medication, in particular immunosuppressants, are not missed. Although this can seem arduous at first, families and children soon get into a routine. Many will have been taking regular medication prior to the transplant and taking the medication becomes as much a part of everyday life as teeth brushing.

Immunosuppression

When a heart is transplanted into a body the immediate reaction of that body is to reject it, just like the body would fight an infection. Of course it is important that the body gradually accepts the new heart and stops fighting it. Medications called immunosuppressants are given twice a day for life to stop the body rejecting the heart.

There are a variety of different medications that work in different ways to reduce rejection. The transplant centres guide the immunosuppression treatment and the choice of drugs depends upon the individual needs of the child and whether they develop any side effects to the medicines. There is more than one drug in each category and so, even if a child reacts to one medicine, another can be chosen.

Calcineurin inhibitors

These form the backbone of the immune suppression regime and most children will be on one calcineurin inhibitor lifelong following heart transplant (usually given twice daily). The two drugs commonly used are Tacrolimus and Ciclosporine. It is vital that doses are not missed. If the medication cannot be

taken (for example, during a vomiting illness) medical advice needs to be urgently sought from the transplant centre. The levels of the drugs are monitored by regular blood tests.

Anti cell proliferation medications

These are often used in addition to calcineurin inhibitors. There are three commonly used (although not together) drugs. They are Mycophenolate Mofetil, Azathioprine and Rapamycin. The choice depends upon the needs of a particular child, for example, if kidney function is a concern then Rapamycin might be chosen.

Steroids

Steroids are given at the time of transplant and for a few days afterwards. Sometimes they are needed for longer. The transplant doctors will advise if this is the case.

Other medications

Antibiotics

Following a heart transplant, children's immune systems are suppressed by the medications and they are therefore more susceptible to infections. Antibiotics are usually given for a period of three to six months following the transplant as the immune system is at its weakest then, to reduce the risk of infection. These may include Cotrimoxazole and Acyclovir. Actual infections are of course treated by specific antibiotics to defeat the germ.

Blood pressure medications

Children often have high blood pressure soon after transplant, most commonly because they overcompensate as they now have good heart function having been used to poor heart function in the past. The high blood pressure then goes away but usually returns some years later due to the effect of the immunosuppressant on the kidney function which then drives the rise in blood pressure. High blood pressure is usually

readily treated with medications, for example, Captopril, Enalapril or Amlodipine.

Diuretics

Medicines to remove excess fluid (for example, Furosemide) are often used early post-transplant, however, in most cases diuretics can be stopped in the months following transplant as the new heart's function normalises.

Statins

Statins have become a standard part of management following heart transplant. Most people know of them for their cholesterol lowering effect. However, whilst this does occur in transplant recipients, they have been shown to help the heart last for a longer period of time. Whilst the reason for this is unclear they probably reduce inflammation in the blood vessels and act as a 'weak' immunosuppressant.



Oliver's transplant journey

At 3.23 a.m. my mobile rang right by me and I heard this happy northern accent saying that a potential heart was available!

Our gorgeous Oliver was always a very poorly child.

He was born with Hypoplastic Left Heart Syndrome (HLHS), also known as half a working heart, and chronic regurgitation of his tricuspid valve.

Oli lived in chronic heart failure from day one, until two years of age. He endured four open heart surgeries, two cardiac arrests, DVT, endocarditis and had a very high-risk mechanical valve fitted within half of his heart.

But we always kept positive and at the age of seven months Oli went to nursery, I returned to work and outside our front door we craved to try and be as normal as possible. Our dream for Oli was to live a life full of fun, love and laughter - although at every regular clinic visit we were reminded that one day soon Oli would definitely need a heart transplant. Oli received only palliative care and what our amazing medics were doing was literally bridging time for Oliver until a transplant was imminent.

Oliver was getting bluer and bluer, he relied totally on his big buggy and gasped so much when he went up the stairs. Our amazing team in Birmingham sent us up to the Freeman Hospital in Newcastle upon Tyne when Oli was about two years old for a transplant assessment. To our total despair we were told a transplant was not possible due to raging high antibodies so this is when Oliver had his mechanical valve fitted. Oliver was initially well but became very ill due to a nasty infection, he fought hard and we eventually returned home two months later.

Miraculously, Oliver coped amazingly with sats (oxygen saturations) of barely 60%, but this was Oli proving that we were all individuals and that we all cope differently under different circumstances. At one point he even got discharged with sats of high 50s - Oli was Oli and no amount of nasal specs full of oxygen helped.

Oliver started reception school in September 2012, and tried hard to keep up although his health was deteriorating drastically. That Christmas we visited the Freeman again with a view to being listed and just after Christmas we had an amazing phone call to say that, by a complete miracle, Oliver's raging high antibodies had vanished - maybe my constant prayers had worked! Tears, anxiety and reality were kicking in and in February 2013 Adam and I drove a 500-mile round trip to sign Oliver's consent form. Oliver was now on the national heart transplant list.

This, we feel, was the scariest moment of our lives. So many friends and family were awkwardly congratulating us but deep down we were petrified! To us there was no going back as in hoping for further surgery, a new drug trial, etc, and we were now on a journey of fate and wondering when our call would come. Would Oliver live or die? These were harsh words to ask, but in the transplant world, these were normal questions!

Oli kept on at school as he loved to be with his friends and we were so keen for life to be as normal as possible. I would collect Oli each day at 2 p.m. and take him for a little treat, which was a chocolate Freddo, but really I wanted to buy him the world. Oli even competed in his first-ever school Sports Day - I could have cried. During Oliver's last day of term I said to his teachers that I hoped very much that I would be seeing them in September: they just smiled but I so meant it. I needed our call soon and I needed it very soon while Oliver was unbelievably keeping so well in himself. Chronic heart failure yes, but coughs and colds, etc, seemed to stay away!

On August 18th 2013 Oliver had the worst day of his little life. He screamed all day and was so irritable; for the first time in years I cuddled him to sleep in our bed in the afternoon after Oli had had one of his melatonin tablets as I honestly believed he would collapse in sheer exhaustion. But he slept for two to three hours and woke up as a new little man, ate a lovely Sunday roast and had a warm bath where I cut his toe nails and even cleaned his ears! I found this odd as this wasn't a school night and I normally would have left the big clean for a different day... Maybe I knew that something was going to happen?

Adam left for work and we all went to bed and Oli lay by me very peacefully and I lay next to him listening to his mechanical valve beating and I felt so sad, I even sobbed. Secretly, life was getting harder, Oliver was so hyperactive and irritable and I was shattered and scared. I had done various interviews on radio and TV and the confident happy woman with pink lippy was a real wreck! I was desperate for that phone call, but truly realised a gorgeous person would have to die to allow Oli to live.

Quite strangely I sent a text to my very worried mum at midnight saying I was fine but just so worried, Oliver needs his heart very soon. Before falling asleep I heard Adam return from work and asked him to sleep in Oliver's room as at last he was settled.

At 3.23 a.m. my mobile rang right by me... And I knew, I just knew! My saliva vanished from my mouth and I heard this happy northern accent saying that a potential heart was available!

I was told to keep calm, have a shower and that transport would be with us in an hour. I woke Adam shaking madly, phoned my mum as my younger son was in bed (bless him) so I needed her to come round. I then stood on the landing and literally sobbed, all I could visualise was our amazing donor family, and how their loved one would still be alive

with machines - what a decision! Still sobbing in the shower I then kicked into strong mode. My bag was already packed so it was now time to explain to Oliver that we were off on an exciting journey. We were blue-lighted to Manchester Airport and took a private jet to Newcastle. Daddy drove up separately as we needed our car.

Arriving at the hospital at about 7 a.m. we walked in with the new nurses that day: everyone was so happy and welcoming!

They took Oli's blood, etc, and then he went off to the playroom. Video recording Oliver seemed a vital thing to do, and we then received the news that the heart was very good! Oli was then gowned up and we were off to theatre. I hate the theatre so made a quick exit, sobbing as usual.

Twelve hours later we were allowed to see our beautiful Oliver. The ventilator and infusions just didn't seem to be



there, although obviously they were. We just saw Oli with pink lips, pink cuticles and looking so different, with sats of high 90s - something we had never seen before!

Oli stayed in a vacuumed airtight room in PICU for three days, and so did we! When Oli went down to the ward he became so poorly and weak, the major drugs were literally making him vomit on an empty stomach. I cannot describe just how sick he was and I felt so scared! I honestly thought one evening how on earth can Oli ever survive this? What had we allowed him to go through? I actually sobbed on a nurse's shoulder in the middle of the night and I remember her saying all the kiddies have this period and that he will pull through. She said that each day he would get stronger. Our lovely nurse Carol was correct! On day five Oli was eating a curry, wanting to play on his Xbox and by day six he was in the gym - what a miracle!



We learnt all about Oliver's medicines and by day 15 the 'home' word was mentioned.

Oli went down for a biopsy due to the past history of high antibodies, so daddy went to pack up our room in the flat and I thought I would start to tidy our room just in case we were going home. Our lovely transplant nurse came in looking worried and explained that Oliver was in acute rejection. We were heartbroken and we sort of knew something was going to happen as Oli had never done things simple!

A big dose of drugs, which Oli struggled with, and then the return to isolation. We were so sad but everyone around us remained positive although our consultant was very concerned and realistic to us that this was not good - Oliver's nasty antibodies had returned.

Constant bloods, a further biopsy, the antibodies were static but not going down and we were to be back in clinic every Monday for the next 12 weeks!

Eventually Oliver's antibodies slowly decreased. He kept really well and he was back to school after the October half term, part-time and after Christmas he was back full-time, physically tired but loving every minute of his new life. We were told that Oliver's fitness would improve slowly as he had never used his little muscles before.

Oliver deep down missed out on his little life so much due to being in hospital for so long. He never spoke or walked until about the age of three, and then by the young age of five fought hard to survive a heart transplant.

All we really want now is for Oli to be a little boy, to play with his peers and use his beautiful new heart to the fullest!

School has always been an issue through lack of understanding and unrealistic expectations of Oli, so we

moved Oli to a beautiful new small school in September 2014 and he is thriving! He's so happy and academically he is progressing, although this has never been a big issue as happiness, fun and politeness are all we ever want for Oli. He now stays for tea at school one evening a week, attends a couple of clubs, is quite literally sports-mad and generally loves school.

We feel like the luckiest family in the world: our gorgeous Oli has been given the gift of life. Oli and his gorgeous little brother are our lives and we can never ever thank our amazing donor family enough. Ever! We think about them every day and write to them, and will cherish our letter from them.



Further information

Little Hearts Matter

Tel: 0121 455 8982

www.lhm.org.uk

Transplant Kids

Email: info@transplantkids.co.uk

www.transplantkids.co.uk

Organ Donation

To register on the organ donor website.

www.organdonation.nhs.uk

British Transplant Games

www.britishtransplantgames.co.uk

Notes

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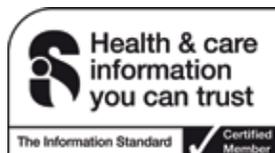
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References are available from the LHM office on request.



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