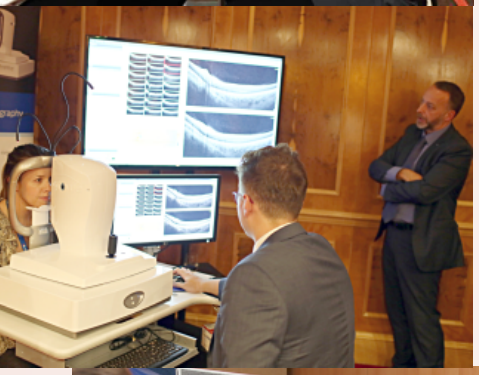
Going From Strength to Strength

Phil Gardner the Chair

As I write this, I'm approaching the final weeks of my three-year term as BARS Chair, and at the end of September the job of leading the association will pass into the capable hands of Beverley Tolley, alongside our new President, Elizabeth Wilkinson.

Ten years ago, I never imagined that a humble screener like myself would ever join BARS Council, and when, to my great surprise, I was elected in 2012, I never imagined that one day I would find myself in the position of Chair. I still have a sneaking suspicion that most of that success is due to a series of terrible admin errors which lie undiscovered to this day, but whatever the explanation, it's been a joy and a privilege to lead the association over the past three years.

I've been extremely lucky throughout that time to be surrounded by a team of experienced and dedicated council members who work tirelessly all year round, giving up their free time to make BARS a success, and I'm very proud of what we've achieved together.

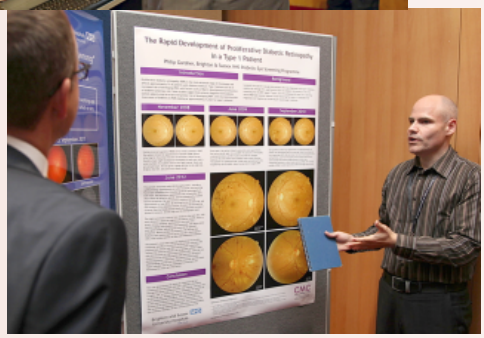


The past three years have seen a number of positive changes and new initiatives. The 2016 conference was extended with the addition of a Failsafe Forum on the Friday afternoon, an experiment which proved so successful that this has now become a standard part of each year's event, with an additional Forum held in May of this year in an attempt to satisfy demand. In 2017 we added even more content to the two days by offering Slit Lamp Workshops on the Thursday morning. These have continued and expanded to cover other elements of surveillance, with tickets selling out every year.

Something for everyone

Whilst offering more at our annual conference than ever before, I'm also proud to have made the event a little more accessible with the introduction of our BARS bursary scheme which provides two fully-funded places at conference for those who would otherwise be unable to attend. Our resources may be limited, but it's always been important to me that BARS does whatever it can to support its members, and witnessing the positive effect this initiative has had on the individuals concerned has been extremely rewarding.

The launch of the new-look BARS website in 2017 was a great step forward, and we've undertaken a number of projects to expand the association's online offering, most notably the introduction of our popular 'R2 or Not?' challenge which ran for more than 18 months and now forms a useful repository of R2 images which is available to members on the BARS website.



The biggest project BARS has undertaken in recent years has been our attempt to develop a set of educational resources and perhaps even a new qualification for screening staff. This has proved to be a challenging task, and has highlighted the difficulty of reconciling the collective ambition and determination of Council with the practical reality of what can be achieved by a small group of people with limited spare time, all of them working for free. The journey has been slower and more challenging than anticipated, but whilst events have forced us to reassess our goals on a number of occasions, the work continues and the fruits of that labour should soon be seen.

As new initiatives have been introduced, established aspects of BARS' work such as the Diabetic Eye Journal have gone from strength to strength, and membership of the association remains at an all-time high. Next year will be the **20th annual BARS Conference** and we have chosen to mark this special occasion by returning to **Newcastle-upon-Tyne**, the birthplace of BARS and location of our very first conference, organised by Professor Roy Taylor and Lillian Lovelock in 2001.

BARS has come a long way in that time, and I'm privileged to have been able to play a small part in that history. Three years ago, in my first DEJ article as Chair, I quoted the late Steve Jobs, who said that the only way to do great work is to love what you do. BARS Council is made up exclusively of people for whom that statement holds true, and we're lucky to represent a profession which is full of like-minded people. As council members move on, there is never any shortage of enthusiastic and dedicated individuals willing to step forward and take their place. I would like to thank the many amazing people who have helped to make my time as Chair so rewarding and enjoyable, and I have no doubt that BARS will go on to even bigger and better things in the future.

2020 bars
Conference in the City of Newcastle

Get involved with BARS

Tunde Peto the leaving President of BARS and Clinical lead of Northern Ireland DESP

I felt privileged and excited to have been elected as BARS President a bit over 3 years ago and I was right, it has been an absolute pleasure to serve in this role.

I started my journey in diabetic eye care in the early 1990's in Newcastle, Australia where I worked in the Diabetes Centre and where one-stop shop was a reality as people with diabetes were seamlessly seen by the eye-team as well (in fairness to everyone, the number of patients were much smaller then!). Parallel to the clinical PhD I was completing, I was also working on the renowned Blue Mountains Eye Study, a population based study that taught us so much about chronic blinding eye diseases. A few years of running the diabetes eye services in South-East Hungary followed by 16 years at Moorfields Eye Hospital concentrating on ophthalmic image analysis gave me a lot of insight into how the field was developing.

I have been working in DESP in the UK since 2002, and was Deputy Head of Training, Education and Workforce planning in the early stages of the national programme. Those were really exciting times, with everything being new and in need of development and I am so proud of the workforce that has been created. We never dreamt of the cadre of roles that were coming up as the programmes evolved, and so the current stage was no less challenging and fulfilling as the previous ones were. Being President of BARS gave me a sense of achievement when I look at the website, the education programmes being developed, and the clinical and scientific content of the conferences. I do hope I hand over the presidency in September with BARS being stronger in every aspect of its remit. I am only leaving as a President but will remain as a strong supporter of DESP, the profession and diabetic eye care! Thank you all for being supportive!

Malignant Retina and Choroid Tumours

Zine Elhousseini MD FRCOPhth and **Susanne Althauser** MD FRCOPhth Royal Free London NHS Foundation Trust

In this article, we go through some of the Malignant tumours that can be found in both the retina and the choroid. There are very few malignant tumours that arise from the retina such as Retinoblastoma, which has an exclusive childhood onset.

Most of the malignant tumours found in the posterior segment are from the choroid or metastases that migrate to the choroid from other organs mainly because of extensive blood and lymphatic circulation of the choroid.

1. Choroidal Melanoma:

The most common primary intraocular malignancy, occurring most often in white adults. The incidence is 1 in 2000 to 1 in 2500 in Caucasians.

Melanoma is uncommon in people younger than 30 years old with an average age at diagnosis being around 60.

Risk factors may include prolonged exposure to ultraviolet light, congenital oculodermal melanocytosis (neavus of Ota), and family history.

The tumour usually consists of a combination of two major categories of cells: spindle cells and epithelioid cells.

Melanoma is usually asymptomatic and painless. Visual effects include blurred vision, floaters, photopsia, and visual field defects.

It appears as a dome-shaped, elevated choroidal mass, typically confined to the subretinal space. About 20% of choroidal melanomas break through Bruch's membrane and take on a characteristic "mushroom shape". Colour varies from brown **(Figure 1**) to grey to pale yellow (amelanotic), with overlying clumps of orange pigment (lipofuscin) which hyperfluorescense using autofluorescence imaging **(Figure 2**). It might lead to serous retinal detachment, vitreous haemorrhage, subretinal haemorrhage, choroidal neovascularization and extra scleral extension with orbital invasion.

Differential diagnosis include: choroidal nevus, choroidal metastasis, combined hamartoma of the retina and RPE, congenital hypertrophy of the RPE and ircumscribed choroidal haemangioma.

Diagnosis is based on ophthalmoscopic features. Ultrasonography reveals an acoustically hollow, dome-shaped or mushroom-shaped mass (**Figure 3**).

Prognosis: Overall 5-year survival is about 80%. Risk factors for metastasis include documented growth, proximity to the optic disc and greater tumour thickness.

The primary goal of management is to prevent metastasis. Enucleation remains the standard treatment for large melanomas. Other options for smaller tumours include transpupillary thermotherapy, plaque or external beam radiation therapy and location tumour resection.

Observation is appropriate for tumours with little evidence of growth.

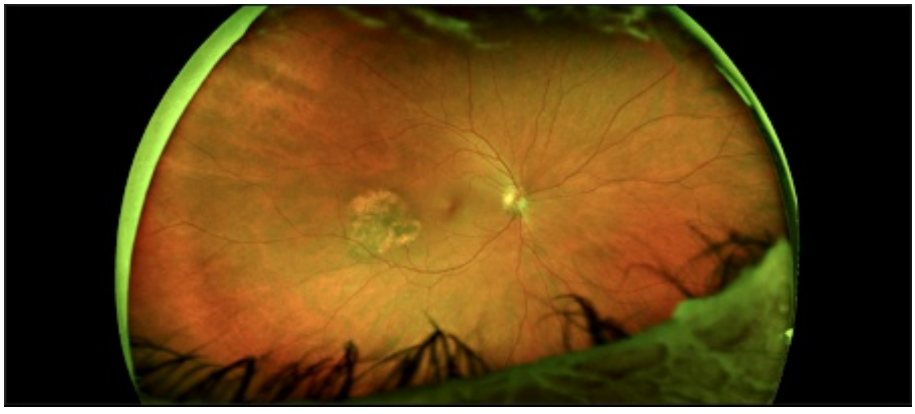


Figure 1: Choroidal Melanoma with orange pigment on the surface.

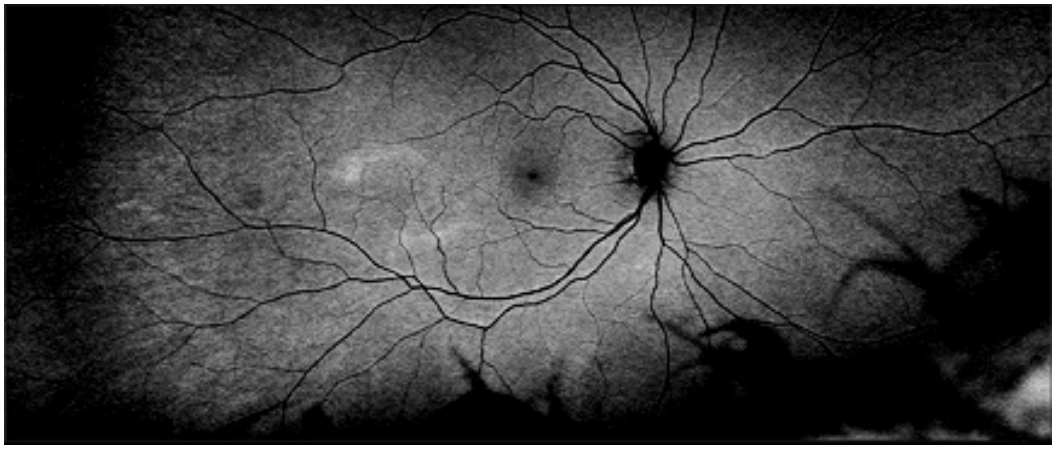
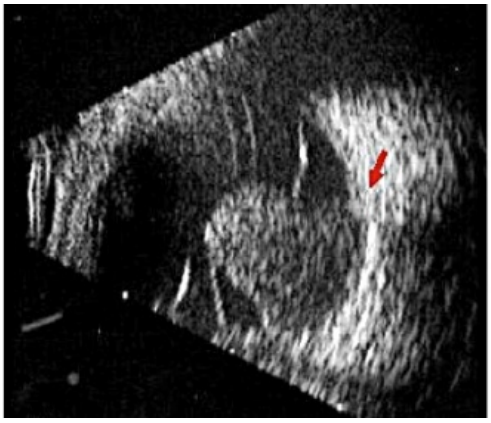


Figure 2:
Autofluorescence image showing hyperfluorescent of Lipofuscin pigment.

Figure 3:
Ultrasound showing mushroom shaped choroidal melanoma.



2. Choroidal Metastasis

Overall, Metastasis is the most common intraocular malignancy. Most commonly arising from lung carcinoma in men or breast carcinoma in women.

Clinically, it appears as an amelanotic, shallow, round or oval choroidal mass posterior to the equator **(Figure 4**), usually unilateral.

Blurred vision (usually painless) is reported in 80%. Floaters and visual field defects are other symptoms, along with eye pain (5% to 15%).

Some have characteristic colouration such as renal cell carcinoma (typically orange red) and carcinoid tumours (typically pink or yellow-orange).

Differential diagnosis includes: Amelanotic choroidal melanoma, circumscribed choroidal haemangioma, retinal astrocytoma and choroidal osteoma.

Most metastatic tumours are relentlessly progressive and if untreated, bullous retinal detachment lead to blindness and secondary angle-closure glaucoma.

Choroidal metastases are most often treated with external-beam radiotherapy, chemotherapy, hormonal therapy, or a combination.

Single, smaller tumours may be treated with plaque radiotherapy.

Patients should be referred to a medical oncologist for management of the primary tumour.

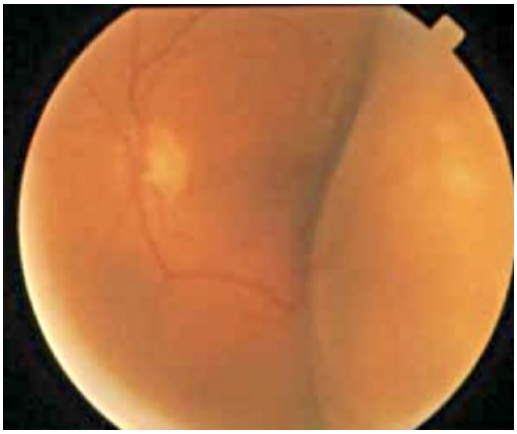


Figure 4: Choroidal Metastasis.

3. Intraocular Lymphoma

Bilateral indolent lymphocytic proliferation with diffuse infiltration of the posterior segment that occurs in two forms:

(1) arising primarily from the eye or CNS;

or **(2)** systemic, usually visceral, lymphoma, metastatic to the uvea. Mainly affects older patients and is associated with CNS lymphoma.

Usually intraocular lymphoma affects immunocompetent patients around their 60 to 70 years of age and is more aggressive in patients who are severely immunocompromised with Acquired Immunodeficiency Syndrome (AIDS).

The incidence appears to be increasing, possibly as a result of more widespread immunosuppression or improved diagnosis.

Histopathology shows the tumour arising from the cells of the retina, RPE, brain, meninges and spinal cord.

Typically, patients present with a history of floaters and painless visual loss. Chronic, unremitting vitritis that is unresponsive to corticosteroids occuring, along with neurologic impairment in an older patient should always trigger suspicion of intraocular lymphoma.

Vitreous inflammation, multiple yellow-white lesions deep to the retina that progressively enlarge and coalesce overlying pigmentary alteration **(Figure 5**).

Anterior uveitis, retinal vasculitis, leading to vascular obstruction and optic disc oedema are among other signs on examination.

Differential diagnosis include: vitritis, amyloidosis, old vitreous hemorrhage, senile vitritis, retinal infiltrates and vasculitis and toxoplasmosis.

In the absence of known CNS disease, vitreous biopsy (through either fine-needle aspiration or pars plana vitrectomy) has the greatest diagnostic yield.

All patients with intraocular lymphoma should be evaluated for CNS and systemic involvement.

Most patients die within a few years from diagnosis if untreated.

Patients with disease limited to the eye may be treated with external-beam irradiation only. Adjunct chemotherapy and corticosteroids prolong survival. Intraocular injection of Methotrexate has showed efficacy as well.

Ocular relapse, especially within the first year of treatment is common.

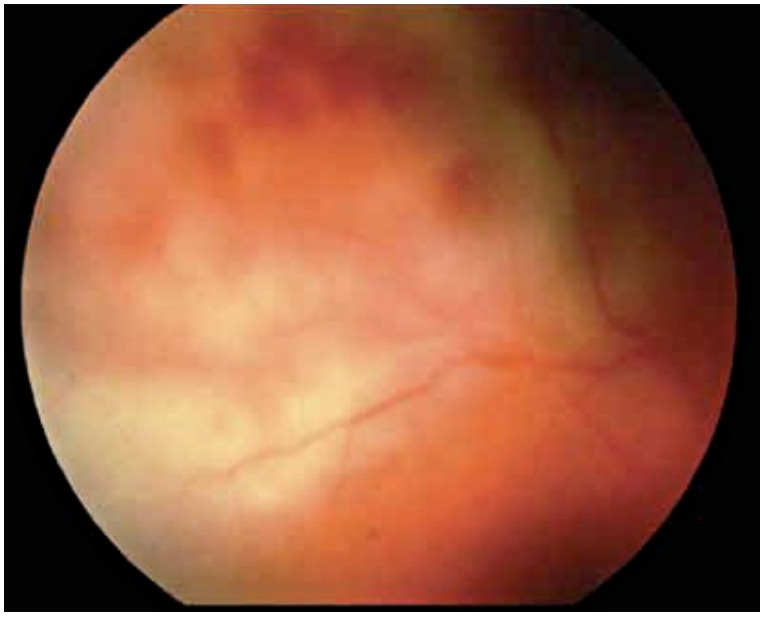


Figure 5:
Intraocular lymphoma, cream coloured deep lesions with vitritis.

BARS in PICTURES

FROST
OPTICAL SERVICES LTD

RETINAL CAMERA IMAGES

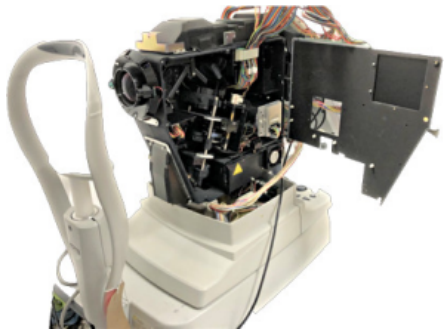
IS YOUR RETINAL CAMERA WORKING AS GOOD AS IT USED TO BE?

IF NOT,

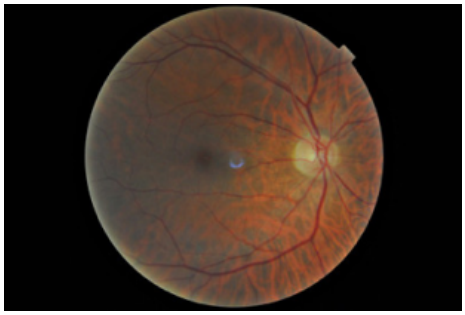
WITH OUR NATIONAL TEAM OF 10 EXPERIENCED OPTICAL FIELD SERVICE ENGINEERS WE CAN PROVIDE A COMPREHENSIVE SERVICE, INCLUDING
A FULL INTERNAL OPTICAL CLEAN FROM ONLY **£475.00** + VAT

WE HAVE A WEALTH OF EXPERIENCE IN THIS FIELD AND CAN SERVICE ALL MAIN BRANDS INCLUDING NIDEK AFC210, TOPCON NW6 / NW8, KOWA AND MANY MORE

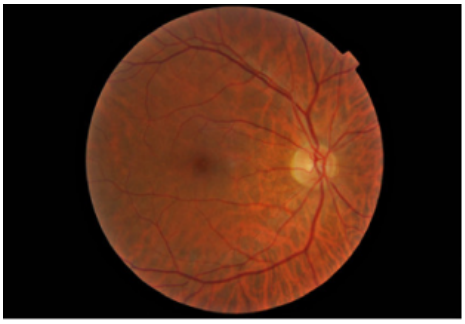
FOR MORE INFORMATION, OR TO BOOK AN APPOINTMENT CONTACT US AT
enquiries@frostoptical.co.uk OR CALL US ON **0118 9792671**



BEFORE



AFTER



Example: Camera images before and after an optical clean

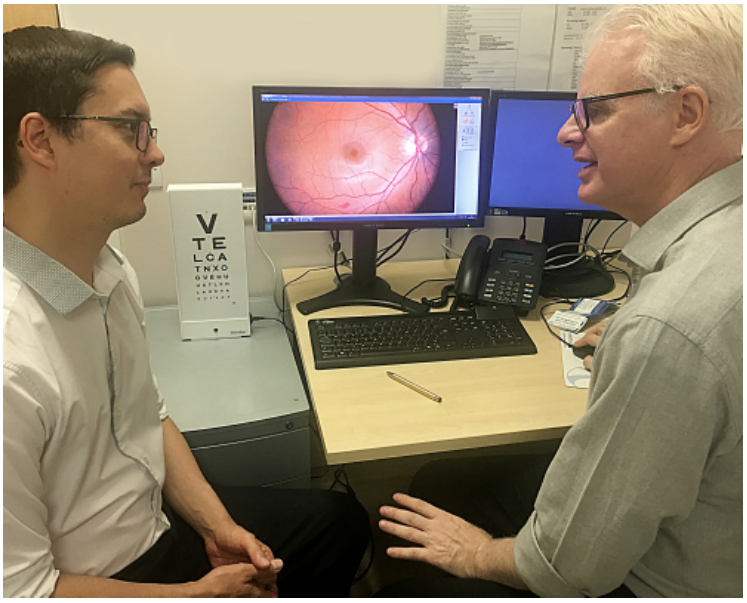
Frost Optical Services Ltd, Unit 7, Fishponds Industrial Estate, Wokingham, Berks RG41 2QJ
T: +44 (0)118 9792671; F: +44 (0)118 9786990; **www.frostoptical.co.uk**
Company Registration Number: 5893393

DIABETES UK
KNOW DIABETES. FIGHT DIABETES.

Let's talk – how to have better conversations with patients

Over the past year, Diabetes UK has been looking at the importance of language used for communication between healthcare professionals and people with diabetes. Dr Susan Aldridge, Editor of Diabetes Update, presents a recent article from **Suraiya Chowdhury**, Leadership Programme Manager, and **Zarina Siganporia**, Shared Practice Programme Manager at Diabetes UK, where they bring together some of the top tips and case studies from both healthcare professionals and people living with diabetes, to demonstrate how positive language can influence great diabetes care. The article has been updated to include some new quotes from retinal screeners.

Diabetes is complicated, and those living with it can feel isolated and overwhelmed. The language healthcare professionals use can go a long way towards motivating a person with diabetes to manage their condition well.



It is also worth remembering that the language used isn't limited to the clinic. Language in invitations or follow-up letters can have an equally powerful impact.

"I knew that I did not want to hear the words 'amputations', 'blindness', 'kidney failure' etc, but what would have gotten me off to a good start in my diabetes life would have been hearing 'you can do this', 'you are stronger than you know', 'diabetes will not stop you' and 'we are here to support you'. Those words and that encouragement could have been the deal breaker in capturing my attention from Day One and would have shown me just what is possible when it comes to living with diabetes."
Laura from Ninjabetic, living with Type 1 diabetes for 16 years

"My 12-year-old son received a beautiful follow-up letter from his consultant. He was so proud to receive it. Words are as important as medicine."
Jo, mum of 12-year-old with Type 1 diabetes

Approach with care

Some things are hard to talk about and that's fine. Just be frank and use clear, simple language. Acknowledge that some topics can be awkward to the patient, like contraception and periods.

Approach this with knowledge and also with caution and care. Using terminology that they will relate to, even if the terms are not clinical, will help both you and the person with diabetes feel more relaxed and comfortable.

Acknowledge your patients' expertise

Ask yourself, "How would I feel if I was sitting on the other seat?" It is always helpful to see the situation through the patient's eyes as they are the ones living with the condition.

"Talk to your patient with diabetes. They often know more than you. They live with it 24/7." ***Helen Atkins, Advanced Diabetes Nurse Practitioner, Diabetes UK Clinical Champion***

Make the time

Sometimes there is a lot to talk about in an appointment, and you might need more time. If possible, advise them to book in double appointments. You can also highlight other ways for them to get in touch, for example, email you or call the Diabetes UK Helpline for additional support. Difficult conversations don't all need to happen at the same time, they can be spaced out and taking the lead from the patient can help determine when they may be able to absorb the information.

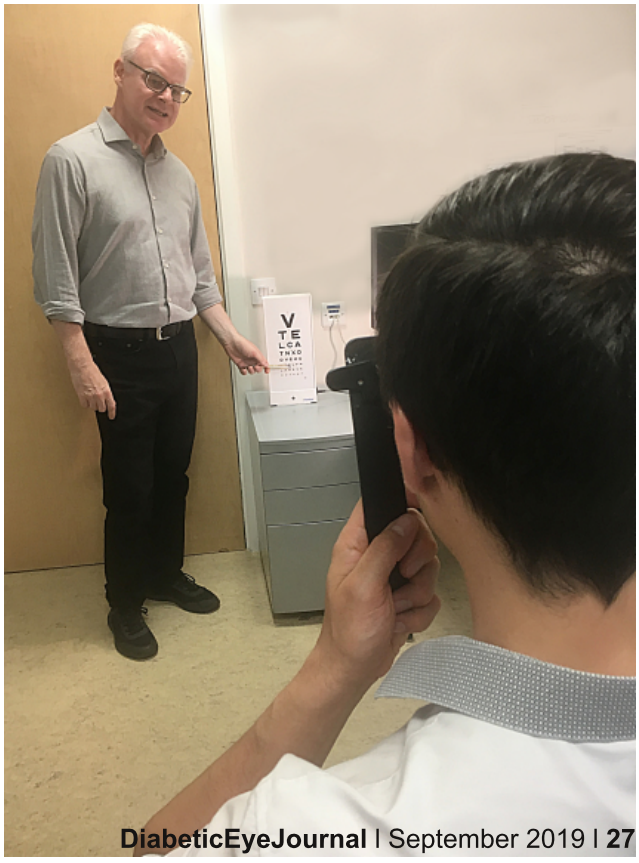
With new patients or patients who are disengaged - perhaps they speak about how the GP told them their last test results were "good" and they're not aware of any specific numbers, I'll say:
"You might see your GP ten minutes per year, and you get 5 minutes with me, but who is the one managing your condition 365 days a year?" ***Simon Daniel-Tong, Training Manager, North Central London Diabetic Eye Screening Programme***

"Never give up on a patient…they will take what they need at the time. Keep the door open and they will be able to come back when they are ready." ***Carol Metcalfe, Advanced Diabetes Specialist Practitioner***

For a world where diabetes can do no harm

Make them comfortable

Creating a positive, safe and friendly environment for appointments can help to create a level of trust between professional and patient. We understand clinics are busy and other colleagues may need to ask questions when you are in a consultation. Try putting a simple sign on your door that reads 'busy' to help reduce the number of interruptions.



DiABETES UK
KNOW DIABETES. FIGHT DIABETES.

Your patient is more than just a number

By understanding their day-to-day lives, you can help your patients manage their diabetes better. Take a couple of minutes before you see them to read their notes. Ask them how they are, what's happening in their life, and wait for their response. It's important to understand the stories behind the numbers. This affects the consultation and paves the way for future interactions.

If you're struggling to engage your patient in conversation or engage them with their diabetes, a simple question about their favourite football team or hobby can often make a huge difference and help to build rapport. Developing a relationship is key, and it is okay for diabetes to not always be the sole focus of the conversation, if that's what's needed to build trust. Often it's more important at the start to developing trust and once your patient trusts you, they're in a better position to take your advice.

With patients who have a history full of non attendance and the reason offered is that they are too busy looking after other dependants, I will say:

"You are structurally an important person who many depend on - understanding the importance of that, you need to make sure you look after yourself and make sure you stay healthy. Giving yourself that time is not selfish but an essential component of continuing to be able to look after others."

The general approach here is that I try to make a narrative for the patient on what to focus on. This might be to try to help engage them with managing their condition, or to engage them with the importance of educating themselves. There are some patients who will simply pass all their trust and responsibility for health on to their GP or other clinicians as they see medical concerns as something to leave to the professionals. So there are times when it is important to help them understand that it is expected and important that they engage.

Where as there are other patients who are too busy engaging with other things i.e. supporting others, travelling, working. When I see some of these types of patients I try to remind them that their health and independence permit them to continue supporting/enjoying these things so that time spent of their healthcare is an important part of ensuring they are able to continue to do these things.

Simon Daniel-Tong

Use our Information Prescriptions

Diabetes UK developed Information Prescriptions[1] as a tool to help healthcare professionals talk to their patients about diabetes and create a care plan. This is a way to give people with diabetes the knowledge they need to manage their condition and some actions to work towards. This will also allow both of you to track progress, celebrate successes and identify where further support is needed.

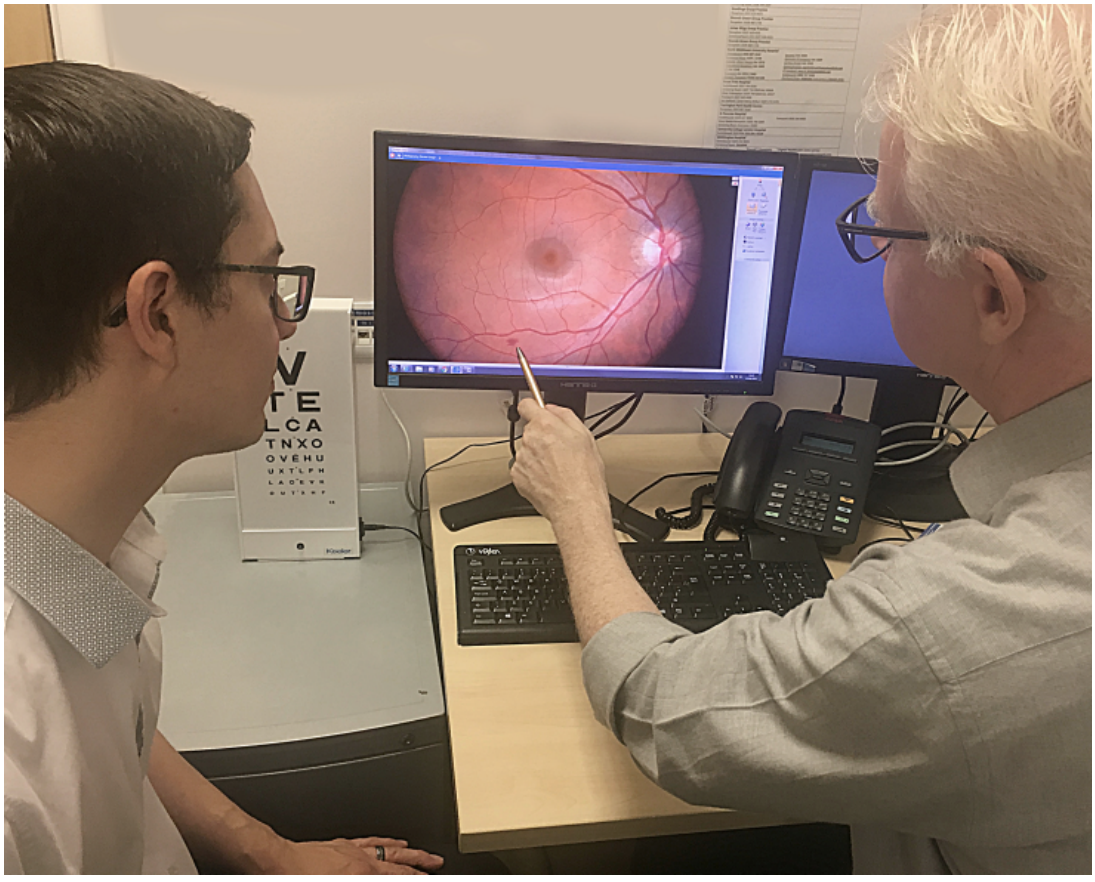
Use open questions to engage your patients

Instead of asking if they have any questions, switch to asking "What questions do you have?" Those questions can lead to more questions and have a positive impact. If you're struggling to get people to open up or talk about their relationship with their diabetes, think about interesting ways to open up the conversation.

"The language we use in our interactions with those we are caring for, who are living with diabetes, is of paramount importance. It is vital that we use verbal and non-verbal language that is not judgemental and instead is respectful, inclusive and encouraging. As we work alongside people living with diabetes, we need to ensure that our role is to promote ownership and motivation for the person to manage their condition well and achieve what is important to them.

Information Prescriptions are a useful tool in promoting effective communication within consultations. They use clear simple language and allow for joint exploration and discussions around a person's diabetes care and goals and how these might be achieved."

Nicola Milne, RGN, RM, Queen's Nurse, Community Diabetes Specialist Nurse



"I normally get the patients to think of just one thing they could change in their behaviour, which could improve their diabetes and then imagine how their future self will be if they did that, then bring it back to now and make those changes"

Dr Farooq Ahmad GP, Director North Merton PCH/GP federation, Diabetes UK Clinical Champion Alumnus

"I often talk to patients who say they are busy at work. I suggest that 'work is part of your life, but it's not your full life. There are other aspects, such as taking time to care for yourself, making time to ensure you attend your retinal screening appointment'. Even if I only have very little time, I encourage them to talk."

Iveta Olejkova, Team Leader, North Central London Diabetic Eye Screening Programme

Want to know more? While there have been several international guidelines, Diabetes Week 2018 saw the launch of the **Language matters: language and diabetes guide** from NHS England[2], to encourage positive interactions with people living with diabetes and subsequently positive outcomes.

Get your patients to set the agenda for their appointments

What do they want to talk about? Don't assume you know what they want to discuss. Ask patient what issues they would like to discuss and the most important things they're trying to get out of the conversation. Agenda setting allows the patient to consider the purpose of the appointment and provides the clinician with an insight into what is most important to the patient, which are often likely to be impacting on the patient's ability to self-manage.

References

1. Information Prescriptions for healthcare professionals. www.diabetes.org.uk/IP-Prof

2. NHS England (2018). Language matters: language and diabetes. www.diabetes.org.uk/up-info-prescription

A Beginner's Guide to Fluorescein Angiography

Richard Hancock FRPS ASIS Hon.FOIA Ophthalmic Imaging Services Manager and **Indu Kumar** MBBS, MRCOphth Clinical Lead from Northgate Public Services (NPS Care) Central Mersey DESP

Introduction – a brief history of ophthalmic photography

Ophthalmic imaging has been with us for a very long time. As early as 400BC, Democritus drew a simple two layer diagram with a hollow tube connecting the eye to the brain. Leonardo Da Vinci added a 3D aspect showing the refraction of light to his diagram of the eye. The first published human fundus photograph was produced by Jackman & Webster in 1886. It was not until the turn of the twentieth century that accurate high quality fundus photography began in earnest. The Carl Zeiss Company marketed a fundus camera, based on a design by Nordenson in 1925, priced at $768. Colour fundus photography was first attempted in 1929. Design and modification to the first Zeiss camera did not alter until 1949, when electronic flash was invented by Edgerton. Modern ophthalmic photography was born and principles devised at this time still remain with us today[1].

In 1959, two medical students in America, H R Novotny and D L Alvis, authored a paper which described retinal angiography using fluorescein sodium injected intravenously[2]. Dr Alvis drew the short straw and he was the first human to undergo fundus fluorescein angiography (**fig 1**)[2]. Throughout the 1960's, development in fundus cameras grew, as did the market. Colour fundus photography became popular, as did stereo imaging of the retina. Carl Zeiss dominated the market worldwide but in the late 1970's Topcon (Japan) produced their first fundus camera, the Topcon TRC-J. Other companies such as Nikon and Kowa soon entered the market. The practice of fundus fluorescein angiography was now common place in most eye departments and was seen as an integral diagnostic procedure. Conventional black & white film was used primarily for fluorescein angiography but in 1989 a new imaging device was developed – digital ophthalmic imaging. Manchester Royal Eye Hospital was one of the first eye hospitals in the UK to embrace this new era in digital ophthalmic imaging technology. Although crude and 'very slow' compared to today's technology, this was the beginnings of an imaging revolution in ophthalmology.

Topcon and Zeiss dominated this imaging revolution from the early 1990's. As technology improved, better resolution of images was made possible with improved storage and retrieval systems. In 2000, Topcon developed an ophthalmic imaging system (ImageNet2000TM) that was to become the market leader which remained unchanged for nearly 10 years, apart from improvements in computer processing speed and resolution. The fundus camera utilised the Kodak MegaPlusTM capture system, which was unrivalled for many years and was also used by NASA for their research space programmes. More recently, we have seen the expansion of the scanning laser ophthalmoscope – which brings us to the present. Scanning Laser Ophthalmoscopy (SLO) technology utilises a confocal laser scanning microscope for diagnostic imaging of the retina. The first SLO was developed in the early 1980's but it is only in the past 13 years that Heidelberg has developed SLO technology and combined fluorescein, ICG and optical coherence tomography imaging into one integrated system – The SpectralisTM. Multimodal imaging of the retina is now possible, giving high resolution images and movie sequences.

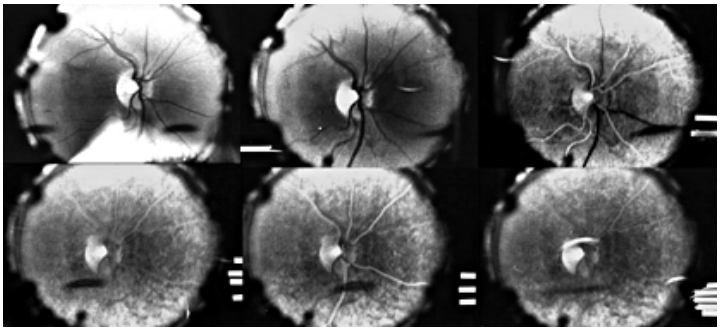


Figure 1.
First human fluorescein angiogram. Note white markers. These are matchsticks used as a timer.

Fluorescein Angiography

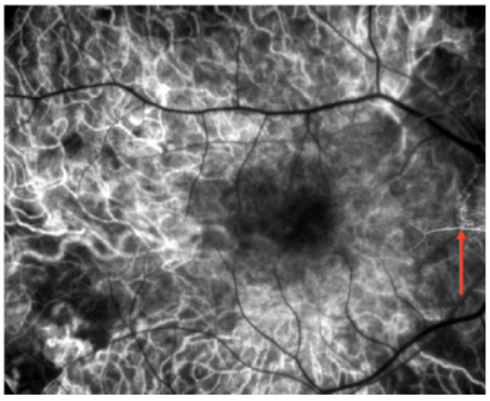
Fluorescein angiography is a diagnostic tool used to reveal blood circulation. Fundus angiography documents retinal and choroidal pathologies using either fluorescein sodium or indocyanine green dye. Diagnostic angiography was first used in 1919. As described earlier, ocular angiography using fluorescein sodium was first performed in 1959. The dye is used to determine ocular blood flow, vessel calibre, circulation blockage causing ischaemia or neovascularisation, for example in diabetic retinopathy or choroidal neovascular membrane in age related macular degeneration.

Fluorescein Sodium (Resorcinolphthalein sodium) ($C_{2O}H_{10}Na_2O_5$)

Fluorescein sodium is the dye used in retinal angiography. It is the disodium salt of the biological dye fluorescein also called eosin. Fluorescein is not the dye used in retinal angiography, it is the salt fluorescein sodium that we use and is freely soluble in water and thus can be used in retinal angiography[1,2]. Fluorescein sodium is highly fluorescent. It absorbs light at around 490nm (the blue light region of the shortest wavelengths in the visible spectrum) and emits at a higher wavelength, 525nm. When injected intravenously, fluorescein sodium is absorbed by plasma proteins and is 80% protein bound. For imaging systems to capture fluorescein sodium, a special set of filters are used in the fundus camera. In a conventional fundus camera, white light generated by the camera flash travels through a blue excitation filter. The fluorescein sodium particles travelling through the blood vessels in the retina become excited and emit a green light (ie light of a higher wavelength). In normal eyes, vessel walls and in particular the pigment epithelial layer have tight cellular junctions. When there is damage to these cells, fluid (ie fluorescein sodium) leaks out. The green light and unabsorbed blue light travel back through the camera optics. It is the green light that contains diagnostic information. A yellow barrier filter is used to block the unabsorbed blue light. The green light then travels back through to the film plane or digital chip and the fluorescein image is produced.

There are five stages to a fluorescein angiogram sequence (**fig 2a-d**):

1. Pre-arterial (choroidal) (**fig 2a**) (normal range 06 – 15 secs)
2. Arterial (**fig 2b**) (normal range 16 – 20 secs)
3. Arteriovenous (early venous) (**fig 2c**) (normal range 21 – 25 secs)
4. Venous (peak fluorescence) (normal range 26 – 35 secs)
5. Late venous (**fig 2d**) (5 – 10 mins)



Pre arterial (choroidal) phase of fluorescein angiogram. Note the cilioretinal artery (red arrow) filling before retinal artery circulation.

Figure 2a.

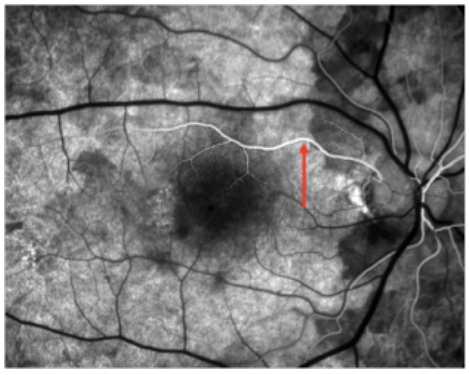


Figure 2b.
Arterial phase of fluorescein angiogram. Cilioretinal artery in a different patient (red arrow).

The above timings are dependent on a number of factors; size of the cubital vein, site of injection, speed of injection, blood pressure, cardiac output, age and weight of the patient and finally dose of fluorescein sodium.

Uveal circulation and cilioretinal artery are branches of the short posterior ciliary artery which is a branch of ophthalmic artery. The cilioretinal artery, seen in approximately 35% of the population is visualised on angiography one to two seconds before retinal circulation begins (**fig 2a**). The central retinal artery is also a branch of ophthalmic artery. As the arteries fill, the choroid continues to evenly fill out (**fig 2b**).

A few seconds later the venous circulation takes up the dye (**fig 2c**) and at approximately 30 seconds post injection there is full venous filling ie peak fluorescence. At 5 minutes the choroidal vessels empty of dye and these can be seen as 'dark' vessels on angiography (**fig 2d**).

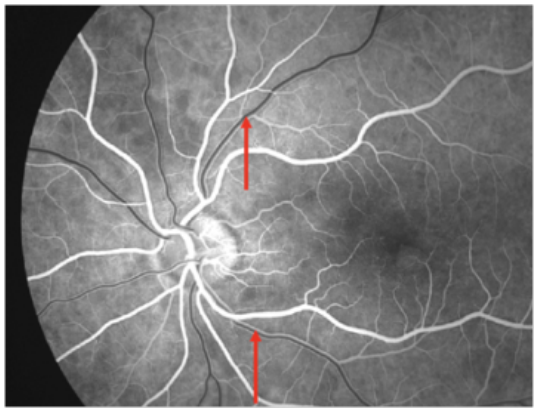


Figure 2c.
Arteriovenous (early venous) phase. Note the laminar flow in veins. Red arrows.

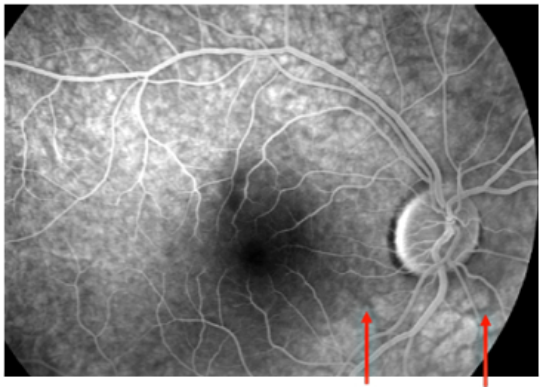


Figure 2d.
Late venous phase of angiogram. Note dark choroidal vessels now devoid of fluorescein dye. Red arrows.

Use in clinic

Fluorescein angiography is an invasive procedure and is done not without risk to the patient. Careful consideration should be given when requesting fluorescein angiography on patients who have other systemic diseases.

Common side effects to fluorescein include skin and urine discolouration. Mild reactions include nausea and vomiting. Although distressing for the patient, these mild side effects are transient and last only a couple of minutes. Moderate reactions include urticaria, syncope and phlebitis. Medical intervention is normally required to assess the severity of the reaction. Severe reactions involve respiratory (bronchospasm and anaphylaxis), neurologic (tonic-clonic seizures) and cardiac (circulatory shock, myocardial infarction and cardiac arrest) systems. All these reactions require immediate medical intervention[1].

Contraindications - There is only one absolute contraindication to injecting fluorescein sodium into a patient – someone with a previous severe allergic reaction to the drug. Pregnancy may also be considered to be an absolute contraindication. There has been a historical misconception in many eye units, that patients having an allergy to shellfish is a contraindication to giving fluorescein sodium, this is not the case. A Kwan et al in 2006[3] reviewed just under 12,000 fluorescein angiography patients. They reported 132 adverse reactions; 115 mild (nausea, vomiting) 17 moderate (urticaria) and 0 severe adverse reactions. Worldwide figures report a risk of death from fluorescein sodium as being 1 in 220,000[4].

The patient should be medically assessed before undertaking ocular angiography. In our unit, the patient is asked about general health, current medication, previous myocardial infarction, previous stroke, any allergies and their blood pressure and pulse taken. There have been reports of tissue damage in arms with patients who have intact lymphatic systems and therefore any previous breast or head & neck surgery is also questioned before intravenous injection of fluorescein sodium into the antecubital fossa, wrist or hand on the affected side.

Complications of giving intravenous fluorescein sodium include extravasation of the dye into the surrounding tissue. Fluorescein sodium has a high pH value and it causes severe pain if it leaks into the surrounding tissue. There have been reported cases of dye extravasation causing skin necrosis. Immediate application of a warm compress should be given. A cold compress will offer some pain relief but a warm compress will dilate the surrounding capillaries and allow the dye to disperse quicker and become less concentrated. The warm packs should be applied for approximately 5 minutes, after which a cold compress can be applied for pain relief[1].

Interpreting fluorescein angiography

There are many books available that give concise descriptive analysis for every classified retinal/choroidal disease. The scope of this article is too limiting and so below is a description of the two most important factors when assessing fluorescein angiography.

Hyperfluorescence: It may be described as an increase in the level of fluorescence at a specific site, RELATIVE to adjacent areas. There are two fundamental causes of hyperfluorescence:

1. *Increased accumulation of fluorescent dye*

Leakage; The term leakage refers to the escape of fluorescein dye from compromised vessels with pathologically increased permeability. During the angiogram there is an increase in the size and intensity of extra vascular hyperfluorescence (**fig 3**).

Pooling; The term pooling indicates accumulation of dye in an anatomical space. For example in a pigment epithelial detachment (PED) (**fig 4**). The dye from the choriocapillaris collects in the space beneath the elevated PED.

Staining; Staining refers to accumulation of dye within a tissue, for example vessel wall staining seen in vascular pathologies (diabetic retinopathy or vein occlusions) (**fig 5**).

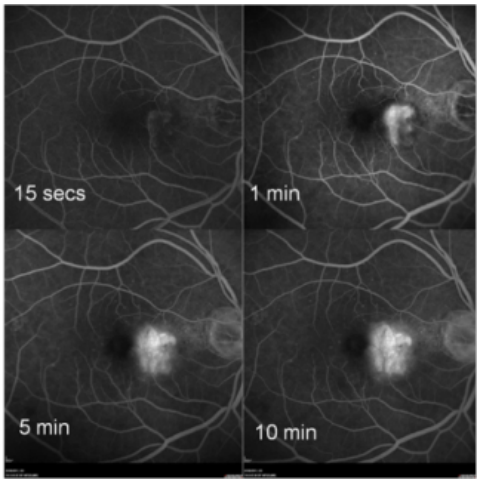


Figure 3.

Leakage on fluorescein angiogram, giving rise to hyperfluorescence. Early, mid and late phases. Note increase in size and intensity of leakage in a choroidal neovascular membrane.

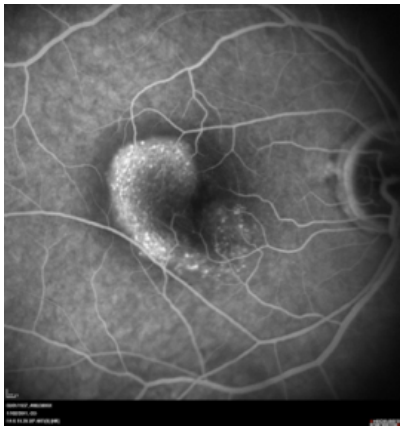


Figure 4.

Pigment epithelial detachment on fluorescein angiogram, showing 'pooling' of dye.

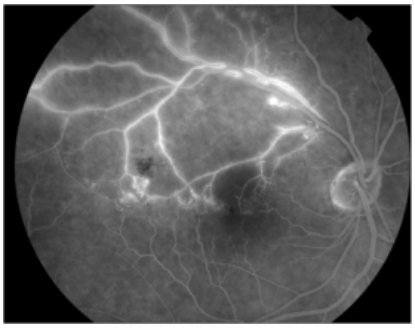


Figure 5.

Staining of vessel walls in a patient with a branch retinal vein occlusion.

2. *Window defect*

The retinal pigment epithelial (RPE) layer contains melanin within the single layer of cells. In a normal eye, melanin in the cells blocks fluorescence from the choroid. A defect within the RPE allows an increased transmission of the normal choroidal fluorescence. During the angiogram sequence, there does not appear to be any increase in the intensity or size of the fluorescence (this is the window defect). Towards the end of the angiogram sequence the choroidal vessels empty of dye and so the fluorescent area (bright on the early sequences) fades away (**fig 6**).

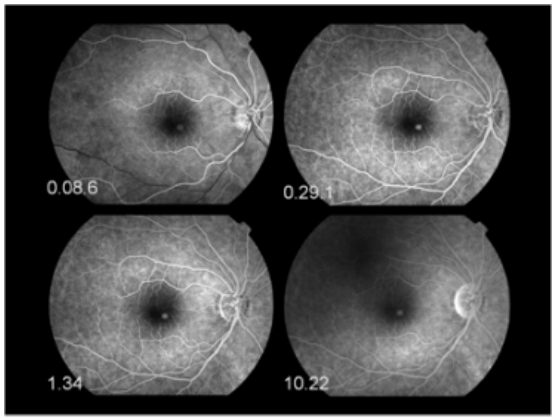


Figure 6.

Window defect on fluorescein angiogram sequence. Note how early bright spot fades on late stage angiogram.

Hypofluorescence: It may be described as a lower level of fluorescence at a specific site, RELATIVE to adjacent areas. Again, there are two fundamental causes of hypofluorescence:

1. *Blocked fluorescence*

Masking of fluorescent areas due to loss of media clarity, vitreous haemorrhages, hyaloid haemorrhages, pre, intra or sub retinal blood, very dense exudates and pigment (**fig 7a**).

2. *Vascular filling defects*

Non perfusion of dye can result in hypofluorescence. Often seen in vascular disorders such as vein occlusions and diabetic retinopathy (**fig 7b**).

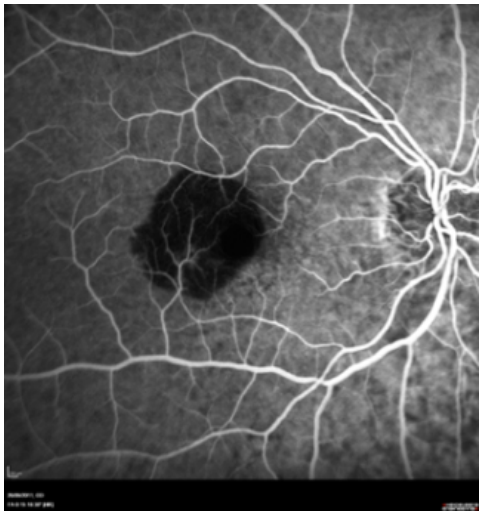


Figure 7a.
Blocked fluorescence, giving rise to hypofluorescence, due to sub retinal bleed.

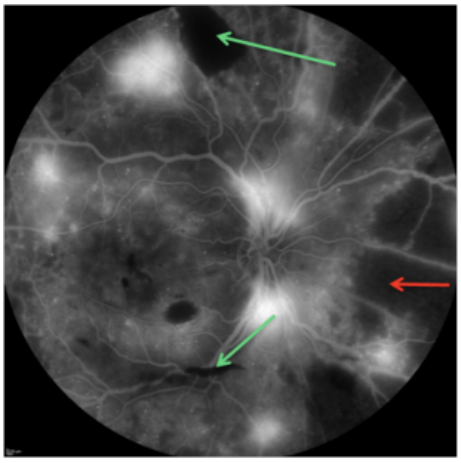


Figure 7b.
Blocked fluorescence (green arrows) due to pre retinal haemorrhage. Hypofluorescence due to non perfusion (ischaemia) red arrow. Note the hyperfluorescent NVE and NVD.

Fluorescein angiography in Diabetic Retinopathy

Fluorescein angiography is carried out on diabetic retinopathy patients for the following reasons:

- Diagnose retinopathy not visible with ophthalmoscope/slit lamp bio-microscopy (vessel wall staining, leaking microaneurysms, occluded vessels, irregular foveal avascular zone and extent of cystoid macular oedema)
- Differentiate between IRMA and New Vessels
- Determine site of ischaemia
- Unexplained vision loss (especially following laser)
- Guide where to treat and what type of treatment
- Prognosis

Background Retinopathy (**fig 8**):
Hyperfluorescent pathology: Microaneurysms, retinal capillary leakage
Hypofluorescent pathology: Hard exudates, haemorrhages

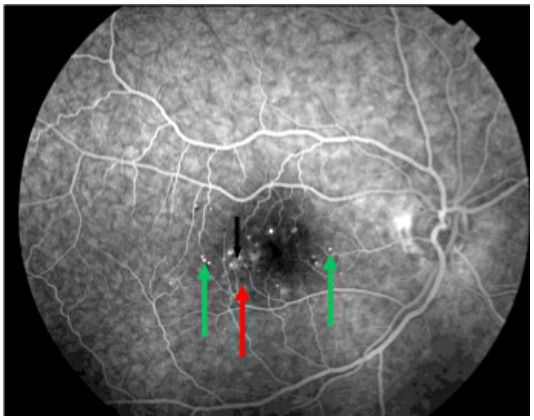


Figure 8.
Fluorescein angiogram (47 secs) showing hyperfluorescent microaneurysms (green arrows) and retinal capillary leakage (black arrow) and hyporfluorescent haemorrhages (red arrow).

Preproliferate Retinopathy (**fig 9**):

Hyperfluorescent pathology: Microaneurysms, retinal capillary leakage, IRMA, vessel wall staining, vessel pruning

Hypofluorescent pathology: Hard exudates, haemorrhages, capillary non perfusion (ischaemia)

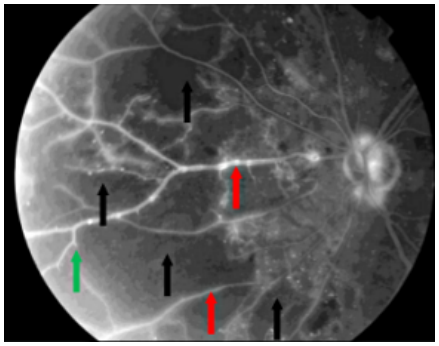


Figure 9.
Fluorescein angiogram (1 min) showing hyperfluorescent vessel wall staining (red arrows), vessel pruning (green arrow) and hypofluorescent non capillary perfusion (black arrows).

Proliferate Retinopathy **(fig 10**):

Hyperfluorescent pathology: Microaneurysms, retinal capillary leakage, IRMA, vessel wall staining, new vessels

Hypofluorescent pathology: Hard exudates, haemorrhages, capillary non perfusion (ischaemia), previous laser with hyperfluorescent ring

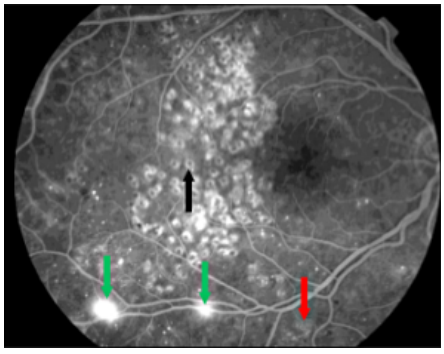


Figure 10.
Fluorescein angiogram (1 min) showing hyperfluorescent NVE (green arrows), IRMA (red arrow) and hypofluorescent previous laser scars - black arrow.

Diabetic Maculopathy (**fig 11**):

Hyperfluorescent pathology: Microaneurysms, retinal capillary leakage, late diffuse leakage at the fovea (**fig 11a**).

Hypofluorescent pathology: Hard exudates, haemorrhages, capillary non perfusion at the fovea (**fig 11b**), previous laser with hyperfluorescent ring

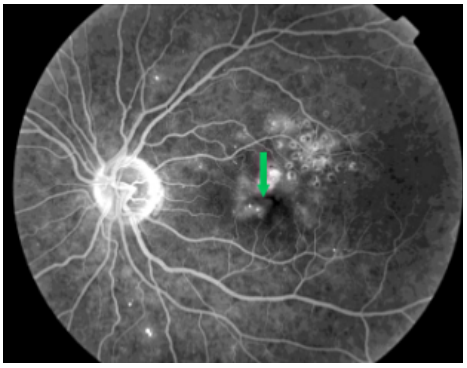


Figure 11a.
Fluorescein angiogram (9 mins) showing hyperfluorescent late diffuse leakage macular oedema (green arrow).

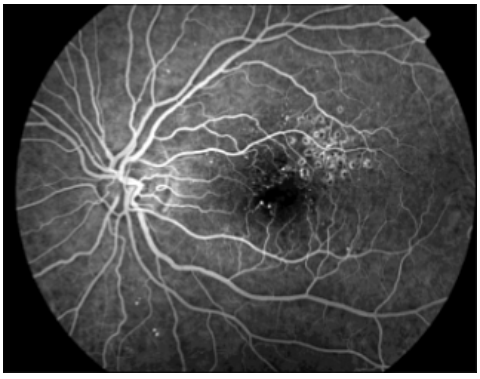


Figure 11b.
Fluorescein angiogram (20 secs) showing hypofluorescent non capillary perfusion at the fovea giving an irregular foveal shape.

References

1. Ophthalmic Photography. Patrick J Saine & Marshall E Tyler. Butterworth- Heinemann 1997. ISBN 0-7506-9783-8.

2. Novotny HR, Alvis DL. A method of photographing fluorescence in circulating blood in the human retina. Circulation 1961;24:82

3. Kwan AS, Barry CJ, McAllister IL et al. Fluorescein angiography and adverse drug reactions revisited; The Lions Eye experience. Clin Experiment Ophthalmol 34:33-38, 2006.

4. Yannuzzi LA, Rohrer KT, Tindel LJ, et al. Fluorescein angiography complication survey. Ophthalmology 93:611-617, 1986.

Positive and Negative experiences of a patient - how can we empower them?

Verity McLelland has lived with Type 1 diabetes for 28 years. She works for Diabetes UK but is writing in a personal capacity.

It still feels quite strange to be discussing my own diabetes, and it has only been in the last two years since coming to work at Diabetes UK, that I have ever really talked about it. I was drafted in to cover a 'patient experience' session at a conference in 2018 and basically had to open up for the first time about my experiences of the eye screening service and hospital eye service. It was this that led me to write this article.

I was diagnosed with Type 1 diabetes when I was 6 years old and it was a huge shock for my family as there was no family history of diabetes and my parents knew almost nothing about it. It is now a very normal thing for me and I have never really known any different, which I think makes it easier for me. Of course, there have been highs and lows (quite literally!!) but I have a stable HBA1c in a normal range. I try and maintain a healthy lifestyle and feel I work hard to keep my diabetes in check. That said, life never runs smoothly and overwhelmingly for me, the hardest and most frightening part has been finding out there were changes at the back of my eyes.

My experiences of using the hospital eye service have not been positive overall, and sadly, comparing it to all other aspects of my diabetes care which have been very positive, my eye appointments really do stand out. The main reasons for this are a lack of clear communication, consistency and empathy from health care professionals I have seen. Being told that there is something potentially wrong with your eyes is a truly terrifying experience and what I have needed from the beginning was some clarity, explanation, and last but by no means least, more compassion from the doctors I have seen. I feel I have realistic expectations about our incredible and precious NHS and it is clear how stretched the services and staff are. I understand time is short but I think it is entirely possible within that time to really help someone with diabetes who comes to your clinic.

Diabetes is a complex condition to live with and manage every day and when someone asks me to describe what it is like this is what I would say. I have to think about every single thing I eat and drink and make calculations about what this will do to my blood glucose levels. For example, if I fancy an apple or even a gin and tonic, I have to work out the carbohydrate in what I am eating and then inject.

Every emotion I feel can also make my levels go up or down. Every time I exercise I have to try and calculate what it will do to my levels. Every time I am ill, I have to be extra careful and test more regularly. Every time I get in my car I have to check my blood sugars.

Sometimes, there is no clear explanation as to why my levels are doing what they are doing (it can be soul destroying when you try so hard and diabetes just chucks a random inexplicable figure at you!). That said, my life is certainly no sob story; it is hard sometimes but I know I am very lucky to have the life I do. Diabetes certainly doesn't define it, but it does make it more complicated and brings a lot of anxieties.

I am fairly certain that many people with diabetes would agree that some of the most frightening statistics you hear about are those to do with complications in the eyes and sight loss in the working age population. I was at university when I went for my first screening appointment and a lovely man took the photos, showed me them and explained that the big spot on the photo was nothing to worry about. He recognised that to an untrained eye, that spot looks pretty scary! I didn't really think much about it afterwards, having always had good appointments with my family optician with no signs of retinopathy.

But then, a few weeks later, I was watching TV in my flat in Brighton when a brown envelope arrived in the post. The letter told me that there was something wrong with my eyes and I needed to go to see a consultant at the hospital. There was almost no explanation or reassurance, and certainly no information leaflet. I was left devastated with a real sense of fear and panic.

That started a routine which I have kept up for the last 12 years of constantly worrying I will lose my sight, never really understanding what is happening with my eyes and, more often than not, feeling at a loss when I come out of my two hospital appointments each year. I struggle to understand why no one really seems to care about me or the situation I am in. My husband attends all my appointments with me and he too has left some of them astounded by what we have heard and how we have been spoken to. Some doctors seem to just want to get me out of the room as fast as possible, looking in my eyes, sometimes explaining what they have seen, sometimes not, and others seem totally confused about why I am there at all! One doctor, about 10 minutes in to my appointment asked me, "Do you have diabetes?"

I want to make it clear that it hasn't all been negative and I have seen some wonderful doctors who have communicated clearly and shown real empathy towards my situation – that was what made those appointments stand out. They have been able to, in that small window of appointment time, make me feel better about a really difficult situation. Of course, the technical part of the appointment is incredibly important, but I would argue that it is also of the upmost importance to make sure that the person sat in front of you feels listened to, has some understanding of what is happening in their eyes and, so importantly, feels that you care about them. Time is short, but a few simple changes in language and eye contact (no pun intended!!) could have radically changed my experiences, reduced some of my anxiety and provided a real impact on my day to day life and relationship with my diabetes.

NHS England has developed **Language Matters**, a resource offering guidance for healthcare professionals, and sets out practical examples of language that will encourage positive interactions with people living with diabetes and subsequently positive outcomes. **The resource can be found here: https://www.england.nhs.uk/publication/language-matters-language-and-diabetes/**

Screeners in Diabetic Eye Careers

Zoe Tobin

DESP Failsafe & Administration Co-ordinator / BARS Secretary

West Sussex Diabetic Eye Screening Programme

Q: What did you do prior to working for the West Sussex DESP?

A: I left my sixth form college at the age of 17 to take a year out after undertaking a qualification in Health and Social care. I wanted a break from full-time education before I went back to college to commence my Teacher Training, which never happened. I got a full-time job in my local Marks and Spencer where I met my partner, Nick.

In 2008, after two years of working at Marks and Spencer, I was ready for a new challenge. A colleague came to me and said that she had found the perfect job for me - A DESP Administrator so, I applied for the role and was delighted to get an interview.

I was really nervous about going for my interview as I hadn't actually been to Worthing Hospital since my dad had passed away in 1998. I got to the interview and met the Programme Manager at that time, Ward Sister, Ophthalmology Manager and the only other DESP Administrator (extremely daunting and I am pleased to say that we have now changed that interview process).

I thought I had done well answering all of their questions but did think they wouldn't want me as I had no administrative experience however, about an hour after my interview I received a telephone call telling me that I had the job!

From there on, the rest is history, I moved in to the Failsafe role after a couple of years in post and then 3 years ago, I became the Failsafe & Administration Co-ordinator for the programme, managing my own team.

Q: What do you enjoy most about your role?

A: I love the fact that no two days are the same. One day, I may be dealing with a backlog of appointments and trying to capacity plan and the next, I may be dealing with a broken PC or camera and trying to resolve the issue.

I really enjoy managing data and loved implementing our MIQUEST queries in 2015, I had to visit each GP Practice and install the queries on their shared drive and provide training. This has helped us develop some great relationships with our GP Practices. Of course, now, we use GP2DRS which has made things simpler.

We have recently introduced OCT clinics as part of our 2018/2019 CQUIN which I have been key in setting up and monitoring. Having these OCT's has significantly reduced our referrals to HES which is brilliant being that the HES are so overstretched, much like everyone else's.

Q: You are on the BARS council, what is it that you do and what do you enjoy?

A: I joined the council in September 2016, I was then elected as the BARS secretary in November 2016 which involves preparing the agenda and taking the minutes at the quarterly meetings. I am also part of the Education Team and we are currently working towards a BARS administration qualification which I am really excited about. I feel that Admin should have something to work towards.

I love being on Council and having my suggestions for improving the annual conference taken on board. I enjoy attending the conference as a Council member as I think it is a great opportunity for networking, socialising and sharing great ideas (at 2am when you can find me at the bar). I have also made some great new friends.

I am up for re-election this year and would really like to remain on Council so I can arrange and host further Failsafe forums.

Q: What do you do in your spare time?

A: I am an animal lover with a crazy house rabbit, Horatio and have recently signed up to be a volunteer for the Cinnamon Trust (CT). The CT is the only specialist national charity which helps to reduce the anxiety in the elderly and terminally ill people that have animals and may not be able to care for them in the short term. As a volunteer I may be asked to volunteer care for animal's daily needs including providing temporary foster care in my home. I am really looking forward to helping this vulnerable group.

THE CINNAMON TRUST

The Cinnamon Trust

The National Charity for the elderly, the terminally ill and their pets

ALL-NEW

THE LATEST IN TOPCON OCT TECHNOLOGY

3D OCT-1 Maestro2

Fully Automated OCT
& True Colour Fundus Imaging,
now with OCTA*

The brand-new Maestro2 with OCTA from Topcon delivers exceptional quality, speed, and rich diagnostic information to help you make important decisions about your patients' health.

Now Featuring
OCT Angiography*

All-New
Glaucoma Hood Report

All-New
Follow Up Scan

- ☑ Fully-featured OCT with Premium Fundus Imaging
- ☑ Auto focus, Auto alignment, Auto capture... Robotic
- ☑ 3D Wide 12x9mm Scan: Retinal Thickness/ RNFL/GCL and Optic Nerve Metrics in just one scan
- ☑ OCTA scan protocols include 3x3, 4.5x4.5 and 6x6mm scan areas*
- ☑ Rich clinical data supports your diagnoses

Topcon (Great Britain) Medical Limited
t: 01635 551120
e: medical@topcon.co.uk
w: topcon-medical.co.uk

Topcon Ireland
t: +353 1 223 3280
e: medical.ie@topcon.com
w: topcon-medical.ie

TOPCON
YOUR VISION OUR FOCUS

*optional extra