

Oral abstracts

Theme 1 – COVID 19: Challenges for, or impact on, eye banking and corneal transplantation

1 CRISIS BECOMES THE NORM: HOW A NON-PROFIT NETWORK WITHSTANDS THE PANDEMIC

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SARS-CoV-2 (corona virus) presents the world with new kinds of challenges. The crisis mode that persisted in many countries also put a strain on the German health system: on the one hand, through the treatment of patients infected with corona, and on the other hand through the cancellation and postponement of elective operations. This had a corresponding impact on tissue donation and transplantation. The effects of the pandemic-related restrictions can be reflected by the rate of corneal donation in the DGFG network: With the beginning of the first closure in Germany, donation and transplant numbers decreased by almost 25% from March to April 2020. After a recovery during summer, the activities were again restricted from October onwards due to increasing infection numbers. Subsequently in 2021 there was a similar trend.

The already careful screening of potential tissue donors was expanded in accordance with the guidelines of the Paul-Ehrlich-Institute. However, this important measure led to an increase in discontinued donations due to medical contraindications from 44% in 2019 to 52% in 2020 and 55% in 2021 (Status Nov 2021). Nevertheless, the donation and transplantation result from 2019 was exceeded and DGFG was able to maintain patient care in Germany on stable level compared to other European countries. This positive result is partly due to an increased consent rate of 41% in 2020 and 42% in 2021 due to a higher sensitivity in the population to health issues during the pandemic. In 2021, the situation stabilised again, although the number of donations that could not be realised due to corona detection in the deceased continued to increase with the waves of infections that occurred.

Low losses in donation and thus in the supply of transplants for patients seem to be due to the fact that a nationwide network such as the DGFG can respond flexibly to changing requirements. For example, if the number of COVID-19 infections varies between regions, it is possible to react to the local conditions to continue donation and processing where possible and allow allocation to regions where transplantation can take place.

In summary it has been shown that efficient donation programs, resilient network structures, awareness of population for tissue donation and effective precautionary measures ensure a safe patient care with corneal transplants also in pandemic times.

2 IMPACT OF COVID-19 ON A NATIONAL SERUM EYEDROPS PROGRAMME IN THE UK

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NHSBT run a Serum Eyedrops programme for the UK, providing Autologous (AutoSE) and Allogenic (AlloSE) eyedrops for patients affected by severe dry eyes. The service is based within the Eye & Tissue Bank in Liverpool.

In February 2020 (pre-pandemic within the UK) there were 1052 patients on the programme. 34% received AutoSE and 66% AlloSE. Due to a recent change in central funding, referrals for AlloSE had increased, creating a waiting list; in March 2020 the list had 72 patients.

In March 2020 government guidelines were introduced to reduce the spread of COVID-19. These measures presented a number of challenges for NHSBT and our ability to maintain the supply of Serum Eyedrops: i) Many AutoSE patients could not attend donation appointments, as they were clinically vulnerable and needed to shield. This issue was addressed by temporarily providing them with AlloSE. This was done with agreement between patients and consultants. As a result, the proportion of patients receiving AlloSE increased to 82%.

ii) There was a reduced supply of AlloSE donations due to a general reduced attendance at blood donation centres. To deal with this, additional donor centres were recruited to collect AlloSE. In addition, the postponing of much elective surgery during the pandemic meant the demand for blood for transfusion reduced, enabling us to build up stock in anticipation of blood stocks reducing as the pandemic developed.

iii) Our service was also impacted by reduced staffing levels, due to staff needing to shield or self-isolate, and the need to implement workplace safety measures. To address these problems, a new laboratory was created, allowing staff to dispense eyedrops and adhere to social distancing. It was also possible to re-allocate staff from other areas within the Eye Bank due to a reduction in demand for other grafts during the pandemic.

iv) There were initial concerns over the safety of blood and blood products as to whether the transmission of COVID-19 was possible through blood. Following a stringent risk assessment by NHSBT clinicians, and implementation of additional safeguards around blood donation, it was agreed that provision of AlloSE was safe and could continue.

Despite all the challenges created by the pandemic, the measures we implemented enabled us to maintain our SE service for existing patients, provide treatment for new referrals and accommodate a significant increase (25% in the 12 months following the beginning of the pandemic) in the number of patients requiring treatment.

3 EMERGENCY SALVAGE OF TIME EXPIRED CLINICAL CORNEAS DURING THE COVID-19 PANDEMIC

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Introduction Corneas for clinical use can be stored for a maximum of 28 days in organ culture medium after death. At the beginning of the COVID-19 pandemic in 2020 it became apparent that; a rare situation was arising in that clinical operations were being cancelled and that there would be a surplus of “clinical grade” corneas. Consequently, when the corneas reached the end of the storage period, if the tissue had appropriate consent, they were transferred to the Research Tissue

Bank (RTB). However, University research had also stopped due to the pandemic and there was a situation where the RTB had good quality tissue without any users. Rather than discarding the tissue, a decision was made to store the tissue for future use by cryopreservation.

Materials and Methods An established protocol for cryopreserving heart valves was adapted. Individual corneas were placed into wax histology cassettes then inside a Hemofreeze heart valve cryopreservation bag with 100 ml cryopreservation medium (10% Dimethyl sulphoxide). They were frozen in a controlled rate freezer (Planer, UK) to below -150°C and stored in vapour phase over liquid nitrogen (VPLN) below -190°C. To assess morphology, six corneas were cut in half, one half was processed for histology whilst the other half was cryopreserved, stored for 1 week then thawed and processed for histology. The stains used were Haematoxylin and Eosin (H&E) and Miller's with Elastic Van Gieson (EVG).

Results Comparative histological examination indicated that there were no visible, major, detrimental changes in morphology in the cryopreserved group as compared to the controls. Subsequently, a further, 144 corneas were cryopreserved. Samples were assessed for handling properties by eye bank technicians and ophthalmologists. The eye bank technicians felt that the corneas may be suitable for training purposes such as DSAEK or DMEK. The ophthalmologists said that they had no preference between the fresh or cryopreserved corneas, and both would be equally suitable for training purposes.

Conclusion Time expired, organ-cultured corneas, can be successfully cryopreserved using an established protocol by adapting the storage container and conditions. These corneas are suitable for training purposes and may prevent discard of corneas in future.

4 NEW STRATEGIES IN THE BARCELONA EYE BANK TO MINIMIZE THE IMPACT OF THE COVID-19 PANDEMIC

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Since the start of the pandemic, the tissue donation in Catalonia (Spain) has decreased drastically. At the beginning of the lockdown (from March to May 2020) there was a drop of around 70% in donation of corneas and of approximately 90% in donation of placentas. Despite the fast updating of standard operating procedures, we had big difficulties in different points. For instance, in the availability of the transplant coordinator for the donor detection and evaluation, in obtaining the necessary PPE (personal protective equipment), or in the resources available in the quality control laboratories for screening. This, added to the collapse that hospitals suffered due to the large number of patients hospitalized each day, made donation levels slowly rebound.

In order to provide solutions to all patients, we tried to adapt quickly to these emerging changes.

In the case of corneas, we found a scenario that we had never had before. Although the cornea transplant plummeted at the beginning of the confinement (decreased by 60% compared to 2019), we run out of corneas -even for emergency situations- at the end of March.

This situation led us to develop a new type of therapeutic solution in our Eye Bank. The cryopreserved cornea for tectonic purposes is a tissue that is kept frozen at -196°C and can be preserved for up to 5 years. Therefore, it is a tissue that allows us to respond to possible emergencies in subsequent similar situations.

Regarding amniotic membrane for ocular care indications, the strategy was completely different. For this kind of tissue, we carried out an adaptation of our processing with two different purposes. On the one hand, to make sure that we could inactivate the SARS-CoV-2 virus, if it was there. On the other hand, to increase the donation of placentas. For this, changes in the transport medium and in the antibiotic cocktail were performed. In addition, an irradiation step was added to the final product.

Little by little, it seems that the donations of corneas and placentas have been recovering. However, it is necessary to think about future contingency strategies in case a stop in donation is repeated.

5 THE IMPACT OF THE PANDEMIC ON OCULAR TISSUE PROCUREMENT : THE EXPERIENCE OF FONDAZIONE BANCA DEGLI OCCHI DEL VENETO

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Introduction Since 21 February 2020, the day that the first Italian COVID-19 case was identified, the organizational and regulatory conditions for ocular tissue donation have undergone numerous changes in order to guarantee safety and quality. Herewith we report the key responses of the procurement programme to these challenges.

Materials and Methods A retrospective analysis of the ocular tissue procured between 1 January 2020 and 30 September 2021 is reported.

Results 9224 ocular tissues were procured during the study period (weekly average: 100 ± 21 tissues, mean \pm SD; down to 97 ± 24 , if only 2020 is considered). During the first wave, the weekly average reached 80 ± 24 tissues, a significant reduction if compared to the first 8 weeks of the year (124 ± 22 tissues/week, $p < 0.001$), falling to 67 ± 15 tissues/week during the lock-down period. Considering the ocular tissues collected in the Veneto Region alone, the weekly mean was 68 ± 20 , a reduction when compared to the first 8 weeks of the year (102 ± 23 , $p < 0.001$), arriving at 58 ± 15 tissues/week during the lock-down period. The percentage of healthcare professionals who tested positive during the first wave was on average 12% of the positive cases in the whole country, and equal to 18% in the Veneto Region alone. During the second wave, the mean weekly recovery of ocular tissue was 91 ± 15 and 77 ± 15 in the Veneto Region, compared to positive cases of healthcare professionals of 4% across Italy and in the Veneto Region. During the third wave, the overall weekly mean recovery rate was 107 ± 14 , and 87 ± 13 in the Veneto Region, with only 1% of positive cases among healthcare professionals in Italy and in the Veneto Region.

Conclusions The most dramatic decrease of ocular tissue recovery occurred during the first wave of COVID-19, notwithstanding the lower number of infected people. This