Impact of COVID-19 on dropped nucleus rates and outcomes in Leeds Teaching Hospitals NHS Trust.

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Introduction

Covid-19 has had an unprecedented impact on healthcare. Increased demand for acute care has lead to huge structural and organisational changes, including changes to service provision, redeployment, waiting times and the cancellation of non-emergency surgery. This is a service evaluation to assess the impact COVID-19 on vitreo-retinal (VR) workload and to quantify the impact on training by investigating cataract surgery complication rates of Posterior capsule rupture (PCR) and dropped nucleus. In turn this will give an insight into the impact of COVID-19 on patients in terms of waiting time, likelihood of complications and visual outcomes.

Posterior capsule rupture (PCR) is a common and feared complication of cataract surgery and as such well audited. The most recent annual National Ophthalmology Database (NOD) audit rates were 1.1% (1) and rates have been reducing year on year (Figure 1). However, dropped nucleus into the vitreous cavity, a potential complication of PCR requiring VR surgery, is poorly audited despite being one of the most feared complications for trainee ophthalmologists (2). In 2003-04 dropped nucleus rates in the UK were estimated to be 0.3%, at a time when PCR rate was 2% (3). More recent literature for dropped nucleus rates in Australia, Europe and India have found the rates to be significantly lower from 0.044-0.12% (4,5,6).

Figure 1: NOD audit of cataract surgery: recorded annual PCR rate, as a percentage of cataract surgeries for participating centres.

Year	PCR rate (%)
2015-16	1.5
2016-17	1.4
2017-18	1.2
2018-19	1.14

Aims :

To determine the impact of COVID-19 on the following:

1. The rates of PCR and dropped nucleus within LTH.
2. Where the dropped nucleus cases are referred from and determine the burden of cataract surgery performed by private AQPs on VR workload
3. The visual outcomes of patients who experience a dropped nucleus

Methods

Medisoft audit suite was used to retrospectively analyse past numbers of cataract and Vitreo-retinal (VR) operations at LTHT over three years from September to September; 2018-19, 2019-20, 2020-21. A Freedom of Information request to Leeds Clinical Commissioning Group provided the number of Leeds patients seen at private AQPs “Any Qualified Provider”. However the data for AQPs is based on the financial year April to March so not a direct comparison for the analysed dates.

Waiting lists and impact on workload at LTH

Since the lockdown in March the trust has failed to reach the aim of operating on 92% of VR patients within 18 weeks (figure 2). Prior to COVID-19 in 2018-19 the average percentage of patients seen within 18 weeks was 97%, after the pandemic the average has been 86%. In addition average waiting times have increased over 2 weeks from 5.2 to 7.4 weeks from referral to VR surgery (Figure 3).

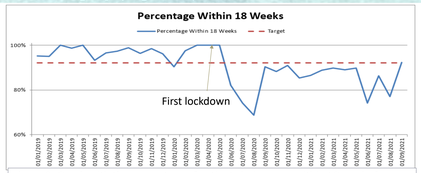


Figure 2: Graph with the percentage of patients being seen within 18 weeks from referral to theatre for VR surgery from January 2019 to September 2021, obtained from the Datawarehouse team at Leeds Teaching Hospitals

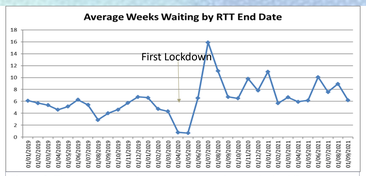
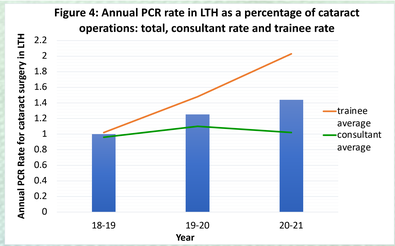


Figure 3: The average number of weeks a patient waits for VR surgery at Leeds Teaching hospitals from referral to theatre, collected monthly from January 2019 to September 2021

Results

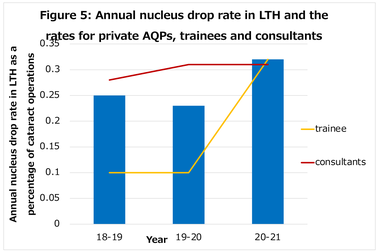
PCR Rate

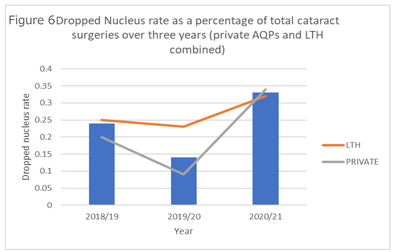
PCR rate at LTH has increased by around 25% each year since the pandemic began from 1% to 1.44%. The consultant PCR rate has remained relatively stable at around 1% whilst annual trainee rates have doubled prior to COVID-19 in 2018-19 1% to 2% over the last 2 years (Figure 4).



Dropped Nucleus

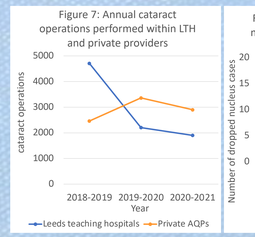
Dropped nucleus (DN) rate within LTH has increased from 0.25% to 0.32%. Surprisingly, unlike PCR rate, the consultant rate was much higher than trainee rates prior to COVID-19 and even private AQP rates carried out normally by consultants or senior trainees was about double trainees pre COVID. Like the PCR rate, consultant rate has remained stable whilst trainee dropped nucleus rate has tripled from 0.1 to 0.32% (figure 5). The private AQP annual dropped nucleus rates show a 58% increase in dropped nucleus rate within the private sector from 0.2% to 0.34% (Figure 6).

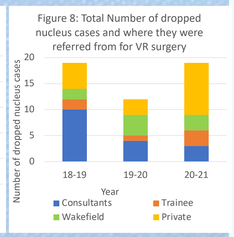




Private vs NHS: Where are the cases coming from?

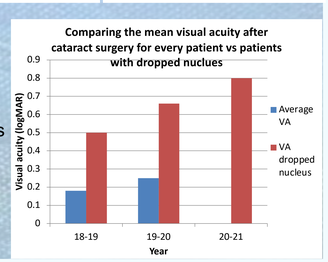
Prior to COVID the majority of cataract operations in Leeds were performed at LTH. During the pandemic there has been a shift and this past year AQPs have completed 1.5 times as many cataract operations (Figure 7).
Unsurprisingly despite a 60% reduction in surgery being performed at LTH, the same number of dropped nucleus cases are being referred. However, whereas pre-covid-19 the majority (63%) of cases were referred from consultants within LTH trust, now 63% of cases are being referred from AQPs (Figure 8).





Visual Acuity

The recorded post-operative visual acuity after these dropped nucleus cases has worsened over the past 3 years from 6/18 in 2018-19 to 6/36 this past year. This is a stark difference compared to the average post-operative visual outcomes for cataract surgery within the trust. Although the trust has not yet received the data for the year 2020-2021, the average VA for 2018-2020 was around 6/9.



Discussion

Covid-19 has caused around a 50% increase in the PCR rate, which is similar to a study at Moorfields which found an increase in PCR rate from 1 to 1.6% after COVID-19 (7). There has been a 37.5% increase in dropped nucleus rate since the pandemic began. Whilst both consultant PCR and consultant dropped nucleus rate has remained similar, the trainee PCR rate has doubled and the dropped nucleus rate at LTH has tripled, perhaps reflecting a break in surgical skills and needs to be monitored.
Dropped nucleus rate was found to be between 0.2-0.3% which is similar to the UK study in 2003-04 study (3) and much higher than more recent studies in Europe and Australia (4,5). This is despite a halving of the PCR rate over the last decade.
In 2018-19 at LTH, the PCR ratio was around 1:1 consultant: trainee, compared to 3:1 consultant: trainee ratio for dropped nucleus at LTH. In 2020-21 the PCR ratio was 1:2 consultant: trainee and 1:1 consultant to trainee for DN rate. Higher consultant dropped nucleus rate may reflect the consultants doing more difficult cases. This may also explain, in part, the three-fold increase in trainee rates after COVID-19, as the proportion of complicated patients on training lists may have increased as well as reflecting time out of training demonstrated in the doubling of PCR rate.

Despite a 63% decrease in cataract surgeries over the past three years within LTH the same number of dropped nucleus cases are being referred to VR. This is directly mirrored in the 63% increase in referrals from private AQPs and highlights the shift in workload generated from the NHS to private sector.
Unfortunately, the post-operative visual outcomes of dropped nucleus are much worse than the average cataract patient. Previous studies have found similar results of averages of around 6/18 VA in patients with dropped nucleus prior to COVID-19 (8, 9). Unfortunately, the mean visual outcomes of dropped nucleus at LTH have worsened from 6/18 to 6/36 over the past two years. It is difficult to say whether this is a true worsening of visual outcome possibly due to more complicated patients who have had a longer waiting time or whether the initial surgery had more complications for example as we were not reviewing patients for as long. The data for 2018-2020 is 6 month follow up where possible, but most 2021 data is shorter. As patients tended to be discharge asap due to nosocomial covid risk now, shorter follow up may result in poorer acuity data.

Conclusion

This project hopefully highlights the impact of COVID-19 on training and resultant increase in PCR and DN rate and the associated poorer impact on patients in terms of waiting times and outcome. This prompts the need to think ahead to accommodating for that extra workload for VR surgery, especially from the private sector as high-volume cataract surgeries resume.

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