Research Round Up- Polypharmacy & Multi-morbidity

Introduction

The last research round up provided you with an overview of some papers related to the subject of antimicrobial prescribing practices in patients being treated for SARS-CoV-2 either the use of these for COVID-19 itself or for detected secondary infection. This month we will be looking at polypharmacy and multimorbidity and the impact the COVID-19 global pandemic has had on prescribing practices in these areas as well as the risk polypharmacy and multimorbidity carry to those who contract COVID-19.

Polypharmacy in the Age of COVID-19: medication management during a pandemic

This Canadian review paper published in January 2021, aimed to highlight the common phenomenon of polypharmacy in the light of the COVID-19 global pandemic. They begin by pointing out that polypharmacy that is inappropriate (*sic*), is a recognised factor in many problem issues in healthcare. They highlight adverse drug events, excessive spending in the healthcare arena, and topically, the complications it can elucidate when managing these patients in a pandemic. They suggest that even appropriate polypharmacy proves a challenge in the latter issue.

The article provides a good overview of factors that contribute to polypharmacy, chiefly amongst these factors is multi-morbidity and the need for numerous medications to manage the co-morbid conditions. The authors categorise the factors into two camps. Firstly, patient related factors which include attitudes, knowledge deficits and deprescribing options. The second category, systems-related factors, include poor coordination of healthcare delivery and healthcare professional attitudes. They acknowledge emerging research that's supports the implication of multi-morbid patients with polypharmacy being associated with poorer health outcomes. They list these as including falls, heart failure, hospitalisation, malnutrition, impaired cognitions and, as they state, most notably in the current context, the contraction and poorer outcomes for them of COVID-19.

The authors conclude the paper with suggestions for interventions to lessen the effect on care for vulnerable persons in this situation. These suggestions are aimed at improving the factors that contribute to the perceived inappropriate polypharmacy (*sic*). A firm suggestion is that the clinician responsible for initiation of medication regimes should, where possible manage any necessary deprescribing. Other proposed interventions include working to change clinician attitudes towards prescribing, improving the coordination of health care services and improving patient health literacy.

They state that managing polypharmacy, both appropriate and inappropriate, is a crucial component involved in managing and improving patient outcomes during the COVID-19 global pandemic.

Potempski, P. & Bilimoria, K. (2021) *Polypharmacy in the Age of COVID-19: medication management during a pandemic.* University of Toronto Medical Journal: 98:1- 73-75.

https://utmj.org/~utmjorg/index.php/UTMJ/article/view/1354/1274

Relation of severe COVID-19 to polypharmacy and prescribing of psychotropic drugs: the REACT-SCOT case-control study

This matched case control study, carried out in Scotland to investigate the relation of server COVID-19 to the patients previous prescribing of drugs. Data was gathered form several sources. Firstly, the number of people testing positive for COVID-19 on PCR test was obtained from the Scottish surveillance database. The authors then elucidated the number of people admitted to critical care settings from the Scottish Intensive Care Society and Audit Group. This captured intensive care and high dependency settings. Finally, death registrations were obtained form the National register of Scotland. Data was gathered on positive tests up to and including 6th June 2020, for admission to critical care up to and including 14th June 2020 and deaths up to and including 12th June 2020. This yielded 4251 positive cases and 36,738 controls. Matching was done on the basis of age, sex and primary care practice (accounting for geographical differences). The authors then further linked these to hospital discharges and primary care dispensed prescriptions.

Analysis of the data compared fatal and non-fatal cases and factored in risk factors. The results suggested that the most severe cases of COVID-19 were associated with the number of non-cardiovascular drugs dispensed and it was noted that this was most pronounced in those not in residential or care homes.

Of 17 drug classes postulated at the start of the epidemic to be "medications compromising COVID", all were associated with increased risk of severe COVID-19 and these associations were present in those without any of the designated risk conditions.

The authors conclude that severe COVID-19 is associated with polypharmacy prior to infection with the virus. The association is not readily explained simply by multi-morbidity but may have some basis in inappropriate polypharmacy or recognised overprescribing of some drugs, examples given included proton pump inhibitors, opioids and gabapentinoids. These associations persisted after adjusting for covariates and were stronger with recent than with non-recent exposure. They postulate that the drugs which are likely to cause sedation, respiratory depression, dyskinesia or affect the gastrointestinal system present the highest risk to outcome after COVID-19 infection.

The authors suggest that introduction of measures such as further guidance on deprescribing and the management and limitation of inappropriate overprescribing may lessen the burden of mortality associated with polypharmacy and COVID-19 infection.

McKeigue, P. M., Kennedy, S., Weir, A., Bishop, J., McGurnaghan, S. J., McAllister, D., Robertson, C., Wood, R., Lone, N., Murray, J., Caparrotta, T. M., Smith-Palmer, A., Goldberg, D., McMenamin, J., Guthrie, B., Hutchinson, S.& Colhoun, H. M. (2021) *Relation of severe COVID-19 to polypharmacy and prescribing of psychotropic drugs: the REACT-SCOT case-control study.* BMC Medicine. 19:51

https://bmcmedicine.biomedcentral.com/track/pdf/10.1186/s12916-021-01907-8.pdf

Multimorbidity, polypharmacy, and COVID-19 infection within the UK Biobank cohort

This research article in an online open access journal aimed to investigate the relationship between multimorbidity, polypharmacy and COVID-19. The authors obtained data form the UK Biobank. UK Biobank contains detailed biological measurements and self-reported demographic, lifestyle, and health information. The parameters examined looked at COVID-19 test samples collected and processed between 1th March and 18th May 2020 with data obtained form Public Health England. This data was then linked to the information contained on the UK Biobank database. In addition to multimorbidity and polypharmacy, factors such as age/sex/ethnicity/socioeconomic status/smoking/physical activity/BMI/systolic blood pressure/renal function were examined.

Of the 428,199 people deemed to be eligible participants in the study, 1,324 returned a positive COVID-19 test. Participants who tested positive for COVID-19 were noted to be mainly older and more likely to be male, non-white, in the most deprived socioeconomic areas, were current/former smokers, rarely partook of alcohol, had a Body Mass Index of greater than 40 , did little or no physical activity, had more long-term conditions and were on more medications, compared to those who did not have a positive COVID-19 test. Polypharmacy was associated with a dose response higher risk of COVID-19. Important limitations noted by the authors include the low proportion of UK Biobank participants with COVID-19 test data (1.05%) and UK Biobank participants being perceived to be more affluent, healthier and less ethnically diverse than the general population.

The authors conclude that increasing multimorbidity, and polypharmacy are associated with a higher risk of developing COVID-19. Those with multimorbidity and additional factors, such as non-white ethnicity, are at heightened risk of COVID-19

McQueenie, R., Foster, H. M. E., Jani, B. D., Vittal Katikireddi, S., Sattar,S., Pell, J. P. , Ho, F K., Niedzwiedz, C. L. ,. Hastie, C E., Anderson, J., Mark, P B., Sullivan, M., O'Donnell C A., Mair, F. S. & Nicholl, B I. (2020) *Multimorbidity, polypharmacy, and COVID-19 infection within the UK Biobank cohort.* PLOS ONE

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0238091

Conclusion

What seems clear from the three articles reviewed that there is an association between polypharmacy and patient outcomes of infection with COVID-19. There are questions as to whether this is due to the number of drugs involved or the presence of multimorbidity or a combination of the two. It also suggests that the classes of drugs and the patient environment could play apart. There does appear to be a link between inappropriate polypharmacy (or overprescribing0 and all suggest that monitoring, review and necessary deprescribing in patients on 5 or more medicines could improve outcomes if infected with COVID-19. The advice for prescribers now and in the future is that regular review of patients on multiple medications is of great benefit, not least in the context of a global pandemic.