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Review

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The COVID-19 pandemic and Urology – reflecting on successful initiatives and lessons in Australia

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Objectives

To summarise the impact of the coronavirus disease 2019 (COVID-19) pandemic on urological practice globally with a focus on Australian initiatives, as the pandemic resulted in radical changes in healthcare infrastructure and policies.

Methods

We conducted a literature review of the Medical Literature Analysis and Retrieval System Online (MEDLINE), Excerpta Medica dataBASE (EMBASE) and Web of Science medical databases. The key terms used to conduct our search algorithm comprised of 'COVID', 'wait list or wait time or delay', 'urology', 'surgery' and 'outcomes', and generated 231 articles. Abstracts were reviewed for relevance and 40 studies selected for full-text review. Society position statements and government level press release statements were identified through citation tracking and additionally included.

Results/discussion

The halt on elective surgical services during the pandemic was deemed necessary to curb infection rates and conserve healthcare resources. However, it resulted in extended wait times and large surgical backlogs with major downstream effects. Australia fared favourably with regards to infection rates compared to international populations consequent upon strict border control, vaccine mandates, and stringent lockdowns. However, similar trends were noted in both oncological and non-oncological urology service reduction, resulting in significant concerns regarding the long-term sequelae of delayed surgery and missed appointments upon patient clinical outcome. Initiatives including collaborative partnerships between public and private hospital sectors, government-funded programmes and adoption of telehealth were successfully established as part of Australia's efforts to stabilise our healthcare system in response to the pandemic.

Conclusion

Australia's pandemic efforts have highlighted the escalating imbalance between increasing demand from a growing and ageing population on an already over-burdened system with finite resources. The additional strain of managing post-COVID-19 pandemic fallout in this context provides further challenges for clinicians and healthcare administrators alike. Collaboration by all stakeholders must continue in order to seek innovative solutions to maximise efficiency of healthcare service utilisation, so that quality universal healthcare provision may continue in the future.

Keywords

COVID-19, pandemic, urology, Australia, initiatives, response, collaboration, innovation

Introduction

The severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) coronavirus disease 2019 (COVID-19) pandemic had drastic impacts on the delivery of healthcare services globally, resulting in radical changes in healthcare infrastructure and policies. To curb infection rates and conserve healthcare resources during that time a halt on many elective surgical procedures internationally and locally in Australia was initiated. Within Victoria, the State government enforced controversially stringent laws that resulted in the State experiencing one of the most extended and severe lockdowns globally with drastic social, economic, and health consequences. Healthcare services were significantly impacted with prolonged wait times and extended surgical waiting lists with major downstream effects. Despite the apparent necessity of these drastic measures, they were associated with serious concerns regarding the sequelae of missed appointments, delayed diagnosis and deferred treatment on patient clinical outcomes and psychosocial health. The full effects of these issues on a long-term population level remains to be determined.

Relative to international communities, Australia fared favourably well with regards to infection rates largely owing to strict border control, vaccination mandates, and stringent lockdowns. Successful government initiatives in the pandemic effort included collaborative partnerships between public and private hospital sectors, the 'COVID Catch-Up' initiative and adoption of telemedicine in clinical settings. However, following the recovery phase from the pandemic, efforts to restore and re-stabilise healthcare services have highlighted the fragility of our current systems to future threats. This is largely related to increasing demand from a growing and ageing population on an already over-burdened system with finite resources and a work force where many feel symptoms of burn out.

The additional strain of managing post-COVID-19 pandemic fallout in this context provides further challenges for clinicians and administrators alike. Ongoing innovative efforts and creative solutions through collaboration by our clinical and political leaders in the future must be sought to bring reform to our healthcare system so that quality healthcare provision may continue.

Methods

We conducted a literature review of the Medical Literature Analysis and Retrieval System Online (MEDLINE), Excerpta Medica dataBASE (EMBASE) and Web of Science medical databases. The key terms used to conduct our search algorithm comprised of 'COVID' AND 'wait list OR wait time OR delay' AND 'urology' AND 'surgery' AND 'outcomes'. An initial 231 studies were identified, of which 172 abstracts were screened for inclusion following removal of duplicates. Inclusion criteria were English-text peer reviewed articles reporting on outcomes related to delays in urological surgery during the COVID-19 pandemic. Further related studies as well as society position statements and government level press release statements were identified through citation tracking during the review process.

Results/Discussion

The COVID-19 Pandemic and Global Health System Response

On December 2019, the first reported cases of COVID-19 originated in Wuhan City, Hubei Province in China. By March 2020, the virus had spread rapidly around the world with over 110 000 cases in 114 countries and was declared by the WHO as a global pandemic [1]. The exponential infection rate in the ensuing years resulted in nearly 775 million reported cases and >7 million deaths worldwide by February 2024 [2].

In an effort to halt the infection rate and conserve healthcare resources during the pandemic, public health measures were imposed by governments throughout the globe by enforcing lockdowns, social distancing measures and personal protective equipment (PPE). Healthcare systems faced the challenge of resource reallocation and organisational restructuring to cope with the overwhelming demand on health services imposed by the pandemic. Like many parts of the world, in Victoria, Australia elective surgery procedures with the exception of Category 1 (<30 days) and urgent Category 2 (<90 days) cases were suspended in March 2020, in an attempt to prepare for the anticipated COVID-19-related demand surge for healthcare resources [3].

Like many surgical subspecialties, the urology community aimed to maintain patient safety by balancing risks of COVID-19 exposure and potential delays in diagnosis and treatment in the context of extreme stress on the healthcare system. In response to this risk the Royal Australasian College of Surgeons published a rapid review and recommendations for preoperative COVID-19 assessment [4], and international societies including the Urological Society of Australia and New Zealand (USANZ) and European Association of Urology (EAU) swiftly published guidelines to assist clinicians in the prioritisation of urological care, reflecting the varied impact of the pandemic in their respective continents [5,6].

International Impact of COVID-19 Pandemic on Provision of Urological Care

Unsurprisingly, the restructuring of healthcare service provision during the pandemic had an impact on acute hospitalisation and inpatient episodes of care, with reduction rates of up to 81% in emergency and 62% of elective surgery internationally [7]. The COVIDSurg Collaborative published an international, prospective cohort study in the Lancet in 2021 enrolling 20 000 patients across 61 countries with 15 cancer types and showed at least 21 million elective operations were cancelled globally in the first 12 weeks of peak interruption, with non-operative rates of 15% in regions with full lockdown [8] and disproportionate effects on vulnerable and marginalised communities [9].

In the UK there was a 30.8% reduction in incidence of prostate cancer diagnosis in 2020. Men who were diagnosed with prostate cancer during this period were slightly older and had more advanced disease [10]. There were similar trends in both oncological and non-oncological urology diagnosis and procedures in the Netherlands [11], USA [12], Italy [13], Poland [14] and France [15], with conflicting evidence of the impact on oncological outcomes to this point. Furthermore, the number of radical prostatectomies (RPs) fell by 26.9%, external beam radiotherapy (EBRT) by 14.4%, with a corresponding rise in use of EBRT with hypofractionation and enzalutamide use [10]. Similarly Barreras et al. [16] demonstrated in a single Spanish tertiary centre longer wait

time for prostate biopsies, but similar median wait times for RP. There was a 5.4% increase in men presenting with metastatic prostate cancer with higher percentage of patients with pathological stage T3 tumours and International Society of Urological Pathology (ISUP) Grade Group 4 disease after RP.

The downstream effects of delayed diagnosis and treatment remains a topic of concern among urologists throughout the world. In addition to societal guidelines from various peak representative bodies including the EAU [6] and USANZ [5], evidence from systematic reviews and expert opinions based on treatment delays prior to COVID-19 were also published [17] to assist with prioritisation of urological procedures during the pandemic. While short deferrals for many urological oncology operations were considered safe without impacting long-term cancer-specific or overall survival, controversies surrounding delays for patients with high-risk prostate cancer remain [18,19]. Notable exceptions against treatment delays existed in many jurisdictions for high-risk cancers such as muscle invasive bladder cancer, high-grade upper tract urothelial carcinomas, testicular and penile cancers [20,21].

Impact of COVID-19 Pandemic on Provision of Urological Care in Australia

While Australia fared favourably compared to the rest of the world in terms of infection rates [22], similar trends were noted in reduced surgical service. Geelong University Hospital saw a 11% reduction in urological surgery [23] and the Royal Prince Alfred hospital in New South Wales reported a decrease of 21% and 32% of urological surgical care during the first and second waves, respectively [7]. In conjunction with the combination of lockdowns and patients' fear of contracting COVID-19, the pandemic also led to downstream effects on provision of care in the outpatient and primary setting. These barriers resulted in a reduction of service provision and patient participation, which was concerning particularly in cancer detection and treatment subsequent to reduced patient screening, referrals for diagnosis, missed follow up, and presentations of malignancies at advanced stages.

Ip et al. [24] retrospectively audited the use of Medicare Benefits Schedule (MBS) item numbers in Australia relating to prostate cancer diagnostic and therapeutic care from June 2018 to June 2021 and included the number of GP attendances including telehealth. Analysis by month when compared to the same month in preceding years showed the largest reduction in PSA tests of 38% in April 2020, coinciding with the lowest claims for GP attendances of 22% during the first wave of COVID-19. Similarly, during the second wave, PSA tests fell by 10% and GP attendance by 34%. In 2020–2021, there were 630 fewer RPs and 155 more implantation of fiducial markers, which was used as a surrogate marker for EBRT compared to the year prior.

These findings were corroborated by Papa et al. [25] who showed there was a 14% reduction in PSA tests, 12% reduction in prostate biopsies, and 16% fewer RPs from January 2020 to December 2021. This group observed sustained reductions in biopsies and RPs compared to the long-term average, with more pronounced effects in States with higher infection rates and enduring restrictions such as Victoria and New South Wales. This likely reflects a trend away from surgery due to elective surgery reduction and downstream effects of reduced PSA testing; however, the reduced numbers of RPs are particularly concerning for likely missed prostate cancer diagnoses. By June 2021, PSA tests, prostate biopsies, and RPs had largely returned to the long-term average trends.

Similarly, John et al. [26] used a smoothing model based on historical figures between 2017 and 2019 to forecast monthly procedural numbers based on MBS item codes in Australia. During the first wave in April–May 2020, there was a statistically significant reduction of 34% and 37% in nephrectomy/nephroureterectomy and transurethral resection of bladder tumours, respectively. Reductions of 13% in RP and cystectomy each were also noted, but did not reach statistical significance. Reductions of 26%, 40% and 28% were seen in diagnostic procedures including biopsies of upper urinary tract and bladder, cystoscopy and transperineal prostate biopsies, respectively. In non-oncological procedures, there was a 33% reduction in rates of stone surgery and 42% in endoscopic surgery for the management of BPH. While rates of oncological procedures increased in the subsequent month of analysis, non-oncological procedures continued to decline reflective of the national halt on non-urgent elective surgeries.

Conversely, Jain et al. [27] showed that the Australia-wide percentage change in prostate cancer testing was minor, with 97% as many PSA tests, 99% as many multiparametric MRIs (mpMRIs) and 105% as many prostate biopsies as the average for preceding years, with no significant differences. This suggests that contrary to international trends [28,29], particularly in highly impacted communities, such as Italy and the USA where prostate cancer diagnoses dropped by 75% [30] and 79%, respectively [31], Australia in 2020 remained largely unaffected with regards to prostate cancer testing, with the exclusion of Victoria that had statistically significant reductions in PSA tests correlating with extended State-level lockdowns. In Victoria, there was an estimated 26% drop in prostate cancer notifications to the State registry from April to October 2020 [32], while transient falls in absolute numbers of PSA tests and RPs were observed in the first 6 months of 2020 [33].

Shin et al. [34] performed two interrupted time series pre-COVID-19 (January 2010–February 2020) and peri-COVID-

19 (March 2020–June 2022) in Australia and used temporal modelling to account for seasonal variations. They showed that pre-COVID-19, monthly PSA testing was already declining at 81 tests per 100 000 annually, likely as a response to position statements by policy bodies on routine prostate cancer screening [35], with a single month drop of 38% in April 2020 correlating with the first wave. There was no change in rates of prostate biopsies. Peri-COVID-19, there was a slight shift towards use of long-acting androgen-deprivation therapy at 4%, with no change in overall volume of radiotherapy or surgery.

Unlike the UK where there was a treatment shift away from surgical treatment for men with prostate cancer to limit the risks of COVID-19 exposure, we did not observe similar trends in Australia. However, based on aggregate MBS service numbers for RPs, there were lower numbers of such operations being performed during the peak COVID-19 waves, so it is likely that the wait time for RPs would have exceeded the maximum period of 90 days. This delay in treatment may have been influenced by guidelines and evidence suggesting that deferred treatment for intermediate- and high-risk prostate cancer had no detrimental oncological outcomes [18].

Of note, the Services Australia MBS Item Report does not include data for public admitted episodes of care and therefore only encapsulates a proportion of the health services provided in Australia. Furthermore, fluctuations in PSA levels and use of mpMRI in diagnosis of prostate cancer are also likely influenced by other factors, including government-funded rebates for mpMRI [36] and practice guidelines for PSA testing [35,37], although Papa et al. [25] showed that the sharp fall in PSA tests among all Australian States in April 2020 were far lower in relative terms than any other time in previous decades.

Although these studies all derived data from the same source, the conflicting results on the pandemic's impact on care provision to patients with urological conditions are likely related to the heterogeneity in the study designs. Variability in the study periods, which may not have accounted for downstream effects of subsequent lockdowns and government responses, defined time intervals (i.e., financial vs calendar years vs biannual vs monthly analysis), as well as inclusion of different item codes as surrogates for various modalities of care, all likely contributed to reported differences in rates of prostate cancer diagnostic and therapeutic procedures during the pandemic.

Long-Term Clinical Outcomes at Population Level Unclear

Regardless of the impact on urological care provision observed during peak waves, the downstream effects on clinical disease course with related complications, patient psychosocial health and economic impacts of missed productivity remains to be fully quantified. Further studies into these relevant aspects are required to evolve our understanding of the impact of COVID-19 on our society and healthcare system. This could be achieved by improving electronisation and promoting visibility and utilisation of cancer registries such as the Australia and New Zealand Prostate Cancer Outcomes Registry during the peri-COVID-19 period [38]. Furthermore, continued collaboration between policy makers and clinicians to improve efficiency of healthcare service provision in the future is necessary for maintenance of the clinical standards that keep patient-centred outcomes at the forefront of clinical work.

The COVID-19 Pandemic-Initiated Developments and Solutions in Australia

Collaboration Between Public and Private Hospital Sectors

While the COVID-19 pandemic undoubtedly led to unprecedented impacts on healthcare systems globally, infection rates in Australia were largely curbed by the rapid implementation of public health measures. Collaboration between Australia's two-tiered healthcare system, Medicare and the private health sector, was made possible driven by adjustments in funding policy, and provided sufficient resources including clinical staff, hospital beds and facilities. This provided necessary acute care resources to accommodate the dramatic changes during times of such unique challenges.

In April 2020, a joint media release announced a partnership between the Australian government and the private hospital sector to rearrange the structure of Australian healthcare provision in an effort to tackle the COVID-19 pandemic [39]. With private hospitals commissioned to service public Category 1 (within 30 days) elective surgery and facilitate transfer of ward and intensive care unit patients to private facilities, over 30 000 hospital beds, 105 000 trained healthcare workers and additional PPE and other healthcare consumables were liberated for the pandemic effort.

The 'COVID Catch-Up' Initiative

In Victoria, restrictions on elective surgery procedures were briefly eased in April 2020, then subsequently reintroduced in June 2020 during the second wave. This further exacerbated the impact on the surgical backlog of cases, which was estimated to be 2.95 million urological surgeries during the 12 weeks of peak interruption globally [40]. In the recovery phase, the Victorian government invested $1.5 billion (Australian dollars) in a 'COVID Catch-Up' initiative to address the 275% increase in pending Victorian surgical cases,

with finances directed towards establishing rapid access metropolitan hospital hubs to deliver day surgery, provide support for further nursing and healthcare worker training, and continued collaboration with the private hospital sector to facilitate 'public in private' cases [41]. However, complex considerations including cost of disease progression, morbidity and mortality from delayed or untreated disease, patient-reported outcome measures and loss of productivity are challenging to accurately quantify.

Telemedicine and Teleconferencing

Prior to the pandemic, the use of telemedicine in Australia, particularly in Urology had been a largely underused resource. Although telemedicine had been shown to demonstrate clinical efficiency, safety and acceptable patient satisfaction in urology [42], barriers to its uptake largely related to lack of technological literacy and access, concerns regarding reimbursement and communication safety regarding personal and health data [43].

In March 2020, the Australian government fast-tracked the use of telehealth and provided clinicians with subsidised equipment and a reimbursement structure for telehealth consultations for patients that did not require a face-to-face appointment. With appropriate triaging, this resource-efficient method permitted continuation of quality care provision while minimising infection risk to staff and patients.

The Royal Australasian College of Surgeons conducted a survey showing 93.9% approval in quality of telehealth consults and identified drivers of patient satisfaction including time and cost savings due to reduced travel and waiting time, reduced need for childcare, and less time away from work [44]. Dubin et al. [45] conducted a global, cross-sectional survey of 620 urologists across six continents to investigate use of telemedicine and concluded an increase of 30% in usage interest, and among those who used telemedicine during COVID-19, 80.9% of participants were interested in continued use. This successful initiative was widely embraced, and teleconferencing was adopted in various other clinical settings including facilitation of unit handovers, multidisciplinary meetings (MDMs), and training and education. In addition, the convenience of telehealth consults lends itself exceptionally well to improving access to healthcare services for rural and regional patients and has largely become routine following the post-pandemic recovery phase in many hospitals.

Teleconferencing also facilitates collaboration across different health networks for multidisciplinary discussions and promotes clinical trial recruitment as seen with the CONFIRM trial (Australian New Zealand Clinical Trials Registry [ANZCTR] registration number 12621001648819) [46]. Further work can be done to establish and formalised inter-health network research and multidisciplinary cancer meetings to assist with clinical trial awareness and patient recruitment to optimise clinical research collaboration.

Directions for Future Improvement: Patient Psychosocial Health and Disproportionate Access for Marginalised and Remote Communities

While the real long-term implications on clinical outcomes as a result of the pandemic at a population level remains to be seen, high levels of patient and caregiver distress, anxiety, depression and reduced quality of life have been reported as a result of radical shifts in care provision [47]. For many patients, even prior to the pandemic, a cancer diagnosis with associated diagnostic tests, wait times and challenges in navigating the complexities of multidisciplinary specialty care and scheduling appointments was substantially distressing [48]. In the context of the COVID-19 pandemic, patients had the additional stressors of fear of infection, treatment delays and social isolation to contend with.

With dramatic shifts in provision of surgical and procedural based care during the COVID-19 response, it is possible that there may now be an increased burden of untreated disease soon to emerge, subsequent to patients avoiding healthcare settings during the pandemic out of concern regarding potentially contracting this infection. Following the acute limitation in elective surgery to conserve resources and reduce potential infection exposure, many hospitals rapidly restored surgical volume to meet backlog of cases. However, Lin et al. [49] showed within this recovery phase, that patient access to elective operations continued to decrease with disparities based on patient age (young and old), language, marital, insurance and socioeconomic status and those living >160.9 km (100 miles) away from care centres.

Studies have predicted that more patients will experience delays in cancer diagnosis, and that cancer mortality will rise as COVID-19 continues to impact healthcare delivery [31], and suggest patients with urological and other cancers may continue to experience distress related to diagnosis and treatment delays. This remains an important consideration in restoring patient trust in a healthcare system associated with COVID-19-related morbidity, and strengthening the clinician–patient relationship, which may already be fragile for patients from marginalised communities.

Ageing Population and Increasing Rates of Healthcare Expenditure

The COVID-19 pandemic actively impacted health expenditure in various complex ways, with an estimated $45 billion spent on COVID-19-specific response programmes such as the National Partnership on COVID-19 Response (NPCR) and COVID-19-related programmes by the Australian Government Department of Health and Aged care between 2019–2020 and

2021–2022. Additional impacts on non-COVID-19- specific health service delivery are complex, and associated costs are hard to quantify precisely. Nonetheless, it is evident that the burden of COVID-19 on the Australian healthcare system extends beyond financial considerations and has led to dramatic impacts in health system administration, workflow, training of healthcare workforce and patient outcomes.

In 2021–2022, Australia spent an estimated $241.3 billion on health goods and services. The real growth after adjusting for inflation in total health spending was 6% more compared to the previous financial year, and higher than the average yearly growth rate over the decade (3.4%). Health spending in 2021–2022 accounted for 10.5% of gross domestic product in Australia, 73% of which was funded by government sources, the majority of which is made up by the federal government funded public healthcare system, Medicare. Between 2015–2016 and 2019–2020, hospitalisation rates for people aged ≥65 years in Australia increased by up to 12%, an average of up to 3% per year [50]. With an ageing population and increasing demand on health service utilisation each year, the burden on our healthcare system will continue to escalate and we must look towards innovative methods to extend our resources and maximise efficiency of healthcare utilisation.

Conclusion

The COVID-19 pandemic was a catalyst for development of synergistic efforts within the Australian healthcare system. Successful initiatives include government funding to reinvigorate health services via the 'COVID Catch-Up' initiative, partnerships between public and private hospital sectors to facilitate a more flexible system to optimise healthcare provision, as well as increased uptake of telehealth and videoconferencing to facilitate access for rural and remote patients, MDMs and collaborative efforts within and between health services. However, the extensive challenges imposed on our healthcare system by the pandemic has also highlighted fragility of current arrangements to future threats. This is largely related to the accelerating imbalance between escalating health demands from a growing and ageing population against the finiteness of healthcare resources. The additional strain of managing post-COVID-19 pandemic fallout in this context provides further challenges for political leaders, clinicians and policy-makers alike. Ongoing innovative efforts and creative solutions through collaboration by our healthcare and political leaders in the future must be sought to maximise efficiency of healthcare utilisation so that quality healthcare provision may continue.

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Disclosure of Interests

None declared.

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Abbreviations: COVID-19, coronavirus disease 2019; EAU, European Association of Urology; EBRT, external beam radiotherapy; MBS, Medicare Benefits Schedule; MDM, multidisciplinary meeting; smpMRI, multiparametric MRI; USANZ, Urological Society of Australia and New Zealand; PPE, personal protective equipment; RP, radical prostatectomy.