

Impact of COVID-19 on small biopsy diagnostic procedures and cancer resection surgeries in the North-West of Ireland

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Received 19 January 2021
Accepted 22 January 2021
Published Online First
4 February 2021

ABSTRACT

Aims To quantify the impact of COVID-19 on small biopsy procedures and cancer resection surgeries in the North-West of Ireland.

Methods Data was obtained from the Histopathology Departments of University Hospital Galway (UHG) and Letterkenny University Hospital (LUH) Laboratory Information Systems to establish the impact of COVID-19 on both the small biopsy (coded P01) and cancer resection (coded P03) caseloads reported from January to June 2020, with comparison made to January to June 2019.

Results From January to June 2020 compared with January to June 2019, UHG had an overall decrease of 714 P01 cases (21.5%) and a decrease of 152 P03 cases (14.4%). In this time, LUH had an increase of 9 P01 cases (0.8%) but a decrease of 48 P03 cases (58.5%).

Conclusions There has been a significant impact on the provision of both diagnostic and therapeutic services in North-West of Ireland due to the COVID-19 pandemic.

INTRODUCTION

The COVID-19 pandemic has occurred from the global outbreak of the SARS-CoV-2, first identified in December 2019 in Wuhan, China. This virus is characterised by rapid human-to-human transmission and leads to the development of an atypical pneumonia.¹ COVID-19 has placed an unprecedented strain on healthcare systems worldwide. It has led to challenges in providing care while minimising the spread of the virus and placed a great demand on hospital resources. Healthcare systems throughout the world have struggled to adapt to the challenges of the COVID-19 pandemic.²

Performing surgery increases the risk of spreading COVID-19 and increases the use of personal protective equipment and hospital resources including personnel. Consequently, surgeons have seen dramatically diminishing numbers of elective procedures performed since the pandemic began.³ Difficult decisions were made, with many jurisdictions postponing elective surgeries during the early stages of the pandemic.⁴ Planned cancer surgeries have been affected by this postponement of non-urgent elective operations.⁵ Patients with cancer are at an increased risk of infection compared with those without cancer both as a direct consequence of their malignancy and because many anti-cancer therapies result in an immunosuppressive state.¹ Furthermore, morbidity and mortality from COVID-19 are increased in patients with cancer.¹

Healthcare systems have been forced to modify treatment pathways in the face of the pandemic. For example, a large international study of breast centres across 41 countries found that 68% of centres analysed recommended endocrine therapy to postpone surgery in luminal A tumours.² Prioritisation of oncology cases has been a challenge, given the need to balance a possible delay in cancer diagnosis or treatment against the risk for potential exposure to COVID-19.⁶

A delay or postponement in cancer resection surgery increases the risk of a pathologically upstaged cancer diagnosis and a decreased overall survival compared with patients undergoing timely surgery.^{7,8} Delays in cancer surgery can result in tumour progression from a curable disease to a non-curable one.⁹ It has been estimated that there will be a considerable increase in the numbers of avoidable cancer-related deaths due to diagnostic delays experienced during the COVID-19 pandemic.¹⁰

The first case of COVID-19 in the Ireland was reported on 29 February 2020.¹¹ Three weeks later, a case of COVID-19 had been confirmed in every county in Ireland.¹² Irish cancer screening services run by the National Screening Service paused in March 2020 on public health advice.¹³ A majority of elective surgeries in Ireland were cancelled during the exponential phase of the COVID-19 pandemic.¹⁴

University Hospital Galway (UHG) is a large university hospital and tertiary referral centre. It is the referral centre for several smaller hospitals in the North-West of Ireland and acts as a regional cancer centre. In UHG, the Histopathology Department would normally report on a wide range of cancer-related pathology specimens including a mix of small and large specimens, from inpatient and outpatient services. To quantify the impact of COVID-19 on diagnostic procedures and cancer resection surgeries, we investigated the trends in small biopsies and cancer resections performed at UHG. To compare the effect of COVID-19 on this level hospital with a smaller, general histopathology department, we investigated general small biopsy and cancer resection caseload of Letterkenny University Hospital (LUH), a level 3 hospital located in North-West of Ireland.

METHODS

In Ireland, the National Quality Improvement Programme in Histopathology (NHQIP) has been operational for 10 years and as part of this



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To cite: O'Connor E, O'Dowd G, Phelan S. *J Clin Pathol* 2022;**75**:270–273.

Table 1 Small biopsies (P01) at UHG

	Month	Total	Mean (SD) per month	Decrease n (%) overall compared with 2019
Overall	January to June 2020	2606	434.3 (172.2)	714 (21.5%)
Overall	January to June 2019	3320	553.3 (71.4)	
Overall	April to June 2020	944	314.7 (124.3)	873 (48.0%)
Overall	April to June 2019	1817	605.7 (46.0)	

UHG, University Hospital Galway.

programme, data on the number of surgical specimens received in each laboratory are collected. As part of the HQIP, procedural codes are applied to surgical specimens for the purpose of coding QI programme required data. Small biopsies excluding gastrointestinal (GI) biopsies are given the code P01. This ranges from (but is not limited to) specimens such as skin biopsies, breast core biopsies, cervical, endometrial, prostate, renal, lymph node biopsies and targeted core biopsy for tumour. Specimens removed as part of cancer resections are coded P03. This includes resections for malignancy and resections for neoplastic/preinvasive disease.¹⁵ The data used in this study were collected for the purposes of the NHQIP.

Data were obtained from the Histopathology Department of UHG and LUH laboratory information systems to establish the quantity of small biopsy P01 and cancer resection P03 specimens reported monthly. Data were reviewed for January to June 2020 and January to June 2019, with 2019 data acting as a control for the expected specimen caseload in a pre-COVID setting.

Further comparison was made between small biopsy P01 and cancer resection P03 specimen caseloads from April to June 2019 and April to June 2020, to focus on the months of the first lockdown in Ireland, where it was anticipated the caseload would have been impacted the most.

Table 2 Cancer resections (P03) at UHG including breast, colon and skin "not otherwise specified" (NOS) cases

	Month	Total, n	Mean (SD) per month	Decrease n (%) overall compared with 2019
Overall	January to June 2020	905	150.8 (45.9)	152 (14.4%)
Overall	January to June 2019	1057	176.2 (13.2)	
Overall	April to June 2020	372	124.0 (44.5)	162 (30.3%)
Overall	April to June 2019	534	178.0 (9.84)	
Breast NOS	January to June 2020	198	33.0 (19.2)	70 (26.1%)
Breast NOS	January to June 2019	268	44.6 (8.1)	
Breast NOS	April to June 2020	59	19.7 (9.9)	94 (61.4%)
Breast NOS	April to June 2019	153	51.0 (4.4)	
Colon NOS	January to June 2020	68	11.3 (7.7)	11 (13.9%)
Colon NOS	January to June 2019	79	13.2 (1.7)	
Colon NOS	April to June 2020	29	9.7 (9.1)	12 (29.3%)
Colon NOS	April to June 2019	41	13.6 (2.51)	
Skin NOS	January to June 2020	184	30.6 (11.3)	17 (8.5%)
Skin NOS	January to June 2019	201	33.5 (10.5)	
Skin NOS	April to June 2020	68	22.7 (6.5)	16 (19.0%)
Skin NOS	April to June 2019	84	28.0 (7.9)	

UHG, University Hospital Galway.

Table 3 Small biopsies (P01) at LUH

	Month	Total, n	Mean (SD) per month	Decrease n (%) overall compared with 2019
Overall	January to June 2020	1153	192.2 (65.1)	Increase of 9 (0.8%)
Overall	January to June 2019	1144	190.6 (16.9)	
Overall	April to June 2020	451	150.3 (68.5)	118 (20.7%)
Overall	April to June 2019	569	189.7 (16.1)	

LUH, Letterkenny University Hospital.

Descriptive statistics were calculated using IBM SPSS Statistics V25. Scale variables were considered normally distributed when skewness/standard error of skewness was between -1.96 and 1.96 .

RESULTS

Small biopsy/core biopsy (P01) caseload at UHG

From January to June 2020, there were 2606 small biopsy P01 cases reported with a mean (SD) of cases per month of 434.3 (172.2). This represents a mean decrease of 119.0 cases reported per month from January to June 2020 compared with January to June 2019 and an overall decrease of 714 cases (21.5%) (table 1). The volume of small biopsy P01 cases reported in UHG from April to June 2020 was 944. The mean (SD) of cases per month in this period was 314.7 (124.3). This represents a mean decrease of 291.0 cases reported per month compared with April to June 2019 and an overall decrease of 873 cases (48.0%).

Cancer resection (P03) caseload at UHG

There were 905 P03 cases reported in UHG from January to June 2020. The mean (SD) of cases per month in this period was 150.8 (45.9). This represents a mean decrease of 25.4 cases per month from January to June 2020 compared with January to June 2019 and an overall decrease of 152 cases (14.4%) (table 2). The P03 caseload reported in UHG from April to June 2020 was 372. The mean (SD) of cases per month in this period was 124.0 (44.5). This represents a mean decrease of 54.0 cases per month compared with April to June 2019 and an overall decrease of 162 cases (30.3%).

Small biopsy/core biopsy (P01) caseload at LUH

From January to June 2020, there were 1153 P01 cases reported with a mean (SD) of cases per month of 192.2 (65.1). This represents an increase of 1.6 cases per month and an overall increase of 9 cases (0.8%) (table 3). From April to June 2020, there were 451 P01 cases reported in LUH. The mean (SD) of cases per month in this period was 150.3 (68.5). This represents a mean decrease of 39.4 cases per month and an overall decrease of 118 cases (20.0%) over the 3-month period compared with the previous year.

Cancer resection (P03) caseload at LUH

There were 34 P03 cases reported in LUH from January to June 2020. The mean (SD) of cases per month in this period was 5.7 (5.4). This represents a mean decrease of 8.0 cases per month and an overall decrease of 48 cases compared with January to June 2019 (58.5%). There were six P03 cases reported in LUH from April to June 2020. The mean (SD) of cases per month in this period was 2.0 (0.0). This represents a mean decrease of 11.3 cases per month and an overall decrease of 34 cases (85.0%) compared with April to June 2019 (table 4).

Table 4 Cancer resections (P03) at LUH

	Month	Total, n	Mean (SD) per month	Decrease n (%) overall compared with 2019
Overall	January to June 2020	34	5.7 (5.4)	48 (58.5%)
Overall	January to June 2019	82	13.7 (2.3)	
Overall	April to June 2020	6	2.0 (0.0)	34 (85.0%)
Overall	April to June 2019	40	13.3 (2.1)	

LUH, Letterkenny University Hospital.

DISCUSSION

There was a significant reduction in both P01 (small biopsies) and P03 (cancer resection) cases reported at UHG during the first 6 months of 2020 compared with the previous year. This was particularly evident from April to June 2020. UHG reported a higher P01 caseload in January and February compared with 2019, which reflects the increasing demand in services that was evident prior to the impact of the global pandemic. From March 2020, the P01 caseload began to decrease, with the lowest volume seen in April 2020. During this time, hospitals were struggling to reorientate their services to deliver healthcare in the setting of COVID-19. May and June 2020 saw an increase in P01 cases, but not to the same level seen in 2019. This reflects a time when services were resuming procedures but not to the same extent as before the pandemic. This demonstrates a clear deviation from the trend in small biopsy P01 cases that would have been expected during pre-COVID times. This decrease in small biopsies may result in delayed diagnoses across multiple disciplines. There is a risk that services will struggle to catch up to the cases which were postponed due to the pandemic. With the anticipated 'COVID-19 wave' of patients needing diagnostic procedures in addition to the caseload expected as services return to full capacity, the healthcare system is likely to face major challenges in terms of workload.

The volume of P03 cases reported by the Histopathology Department at UHG decreased dramatically in April 2020, a 56% (n=94) decrease compared with April 2019, reflecting the postponement of a majority of elective surgeries in Ireland during the exponential phase of the pandemic (table 5). During May and June 2020 cancer resection caseload began to increase, but not to the same extent as in 2019. In UHG, the most frequently encountered P03 specimens during the study period for both 2020 and 2019 were breast, colon and skin. In the first 6 months of 2020 compared with 2019, P03 specimens coded 'breast NOS' decreased by 26.1%, P03 specimens coded 'colon NOS' decreased by 13.9% and P03 cases coded 'skin NOS' decreased by 8.5% (table 2) compared with 2019. The impact from April to June was even more pronounced, as breast NOS cases decreased by 61.4%, colon NOS cases decreased by 29.3%

Table 5 P01 and P03 caseloads per month in UHG

Month	2020 P01 total caseload	2020 P03 total caseload	2019 P01 total caseload	2019 P03 total caseload
January	667	210	497	161
February	576	143	454	167
March	419	180	552	195
April	179	73	605	167
May	342	144	652	186
June	423	155	560	181
Total	2606	905	3320	1057

UHG, University Hospital Galway.

Table 6 P01 and P03 caseloads per month in LUH

Month	2020 P01 total caseload	2019 P01 total caseload	2020 P03 total caseload	2019 P03 total caseload
January	261	198	14	17
February	230	168	9	14
March	211	209	5	11
April	83	207	0	11
May	148	187	0	15
June	220	175	6	14
Total	1153	1144	34	82

LUH, Letterkenny University Hospital.

and skin NOS cases decreased by 19.0%. The backlog in procedures is likely to apply additional pressure to a system which is already extremely busy, and this needs to be addressed before problems arise in the future.

LUH, a smaller general histopathology centre, had an increase of P01 cases during the first 6 months of 2020 compared with 2019 (table 6). However, when we examine the months of lockdown from April to June, there was a decrease of 20.7% P01 cases in 2020 compared with the same months of 2019 (table 6). The amount of P03 cases dramatically reduced in the first 6 months of 2020. There were no cancer resection cases reported in April or May 2020 in LUH. A return of P03 cases was experienced in June, but not to the same activity level as in 2019. From April to June 2020, there was an 85.0% reduction in the P03 caseload of LUH compared with the same months in 2019.

It should be noted that during the first wave of COVID-19 from April to June 2020, a proportion of cancer resection surgeries for UHG was performed at a private hospital, which may have negated some of the impact of reduced activity at UHG. LUH had no adjacent private hospital to perform surgeries. In fact, a number of surgeries scheduled in LUH were performed in a private hospital in Galway with the subsequent histology analysed in UHG. Still, when we compare both hospitals together, we see notable decreases in P03 cancer resection cases across both departments.

CONCLUSION

There has been a significant impact on the provision of both diagnostic and therapeutic services in both UHG and LUH due to the COVID-19 pandemic. These trends need to be followed closely to monitor the service and ensure the volume of small biopsies and cancer resections return to levels that were in operation prior to COVID-19.

Handling editor Runjan Chetty.

Acknowledgements The authors would like to thank Jennifer Ruane, senior medical scientist, Histopathology Department, University Hospital Galway, and Kerry Alcorn, chief medical scientist, Histopathology Department, Letterkenny University Hospital, for their support.

Contributors All authors were involved in the analysis and/or acquisition of data for the project, either drafting the work or revising it critically and approving the final version of the paper and agree that any questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; internally peer reviewed.

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