Impact of the COVID-19 pandemic on cytopathology services in the West of Ireland

The COVID-19 pandemic arose from global transmission of the novel coronavirus SARS-CoV-2 which is thought to have originated in Wuhan, China at the end of 2019.[1] This virus is characterised by rapid human-to-human transmission and leads to the development of an atypical pneumonia.[2]

The impact of COVID-19 on healthcare across the globe has been dramatic. Cytopathology services have seen a reduction in samples received during 2020, especially involving samples obtained from invasive procedures such as fine needle aspiration (FNA) and bronchial washings.[3] In many jurisdictions, the risk of COVID-19 has led healthcare settings to prioritise patients at risk of malignancy for cytopathology investigations. This has led to an increased proportion of malignant cytology during COVID-19.[3] Each procedure leading to a cytology specimen needs a careful risk–benefit analysis incorporating the potential risk of COVID-19 to both the patient and healthcare providers.[4] There is still a need to maintain timely malignancy-related diagnoses, as a delay in diagnosis could lead to increased cancer-related mortality.[4]

University Hospital Galway (UHG) is a large university hospital, tertiary referral centre for several smaller hospitals in the North-West of Ireland and acts as a regional cancer centre. The cytopathology department in UHG reports on a wide range of cytology specimens for both inpatient and outpatient services. To investigate the impact of the COVID-19 pandemic on cytopathology services in the West of Ireland we investigated trends in non-gynaecological (FNA and exfoliative) cytology caseloads at UHG for a continuous 24-month period, January 2019 through to December 2020. FNA involves using a needle attached to a syringe to collect cells from lesions or masses in body sites, for example, thyroid gland.[5] Exfoliative refers to samples of cell collected after they have been either spontaneously shed by the body of manually scraped/brushed off a surface in the body, for example, pleural fluid.[5] The year 2019 acts as a pre-COVID-19 reference for the typical volume of cytology specimens encountered in a calendar year, with 2020 acting as a calendar year impacted by the COVID-19 pandemic.

Table 1 Malignant cytology in 2019 and 2020

Year	Diagnosis	Frequency/caseload
2019	Malignant	242
2019	Not definitively malignant	928
2020	Malignant	222
2020	Not definitively malignant	649

From January to December 2019 there were 1170 non-gynaecological cytology cases reported in UHG. 20.6% (n=242) were positive for malignancy (table 1). From January to December 2020 there were 871 non-gynaecological cytology reported in UHG. 25.4% (n=222) were positive for malignancy. This represents a 25.5% (n=299) reduction in non-gynaecological cytology cases in 2020 compared with 2019 (table 2).

There was a statistically significant increase in the proportion of non-gynaecological cytology diagnosed as malignant in 2020 compared with 2019 (Pearson χ^2=6.56, p=0.012, OR 1.312, 95% CI 1.065 to 1.615) (table 3). The absolute volume of malignant cytology remained similar in 2020 compared with 2019 (242 in 2019, 222 in 2020—a decrease of just 22 cases).

Bronchoalveolar lavage (BAL) cases included cases labelled bronchial biopsy, bronchial washings, and bronchial brushings. In 2020, there were 172 BAL coded procedures performed. Of these, 11.6% (n=20) were positive for malignancy (table 4). In 2019 there were 395 BAL coded procedures performed. Of these, 8.6% (n=34) were positive for malignancy. This represents a 3% increase in the proportion of BAL positive for malignancy in 2020 compared with 2019, however, this difference is not statistically significant (Pearson χ^2 1.269, p=0.277, OR=1.397, 95%CI 0.779 to 2.505). Despite the similarity in proportions of malignant BAL cases across years, there has been a reduction of 41.1% (n=14) in the absolute volume of BAL cases positive for malignancy in 2020 (n=20) compared with 2019 (n=34). Overall, BAL cytology cases fell by 55.6% (n=223) in 2020 compared with 2019.

In UHG there has been a clear reduction in the caseload of FNA and exfoliative non-gynaecological cytology in 2020 compared with 2019. Despite this, the absolute number of malignant diagnoses remained similar, which means the most probable cause of the overall reduction in caseload was a decline in non-malignant cases. This likely reflects a rigorous process identification and testing of patients with a high-risk of malignancy. Patients with a lower malignancy risk who would normally be offered cytology procedures may have been required to postpone the procedure following a risk–benefit analysis incorporating the risk of COVID-19 to patient and staff. These numbers demonstrate a quite successful attempt to provide cytology services to those in most need of diagnostic testing during the difficult months of COVID-19 as, despite a large reduction of overall procedures, the absolute volume of malignant cytology remained comparable to 2019.

Certain procedures are more high risk than others in terms of aerosolisation/COVID-19 risk and thus may have been impacted more than others. Signs of this can be seen by the notable reduction in BAL cytology specimens in 2020. BAL is an aerosolised procedure, as such clinicians are at more risk of respiratory pathogens than non-aerosolised procedures. Unfortunately, the reduction in BAL procedures led to a 41.1% (14) reduction in the absolute number of malignant BAL cytology diagnosed in 2020 compared with 2019. This highlights one of the challenges associated with raising the threshold for diagnostic cytology procedures—as the

Table 2 Most frequently encountered non-gynaecology cytology specimens (exfoliative and fine needle aspiration) in 2019 and 2020

Specimen type	2019	2020	Difference % (n)
Thyroid	228	193	15.3 (35)
Lung	616	352	42.8 (264)
Neck NOS	77	53	31.1 (24)
Salivary gland	73	61	16.4 (12)
Overall caseload	1170	871	25.5 (299)

NOS, not otherwise specified.

Table 3 Proportions of malignancy cytology in the most encountered specimen types in 2019 and 2020

Specimen type	2019	2020	Proportion change from 2019 to 2020 (%)	P value (χ^2 analysis)
Thyroid	7/228 (3%)	3/193 (1.5%)	1.5	0.355
Lung	127/616 (20.6%)	92/352 (26.1%)	5.5	0.055
Neck NOS	31/77 (40.2%)	20/53 (37.7%)	2.5	0.856
Salivary gland	13/73 (17.8%)	15/61 (24.5%)	6.7	0.396
Overall	242/1170 (20.6%)	222/871 (25.4%)	4.8	0.012

NOS, not otherwise specified.

Table 4 Bronchoalveolar lavage cytology in 2019 and 2020

Year	N	Caseload positive for malignancy (% (n))	P value for difference in proportions of malignant cases between years	OR (95% CI)
2020	172	11.6% (n=20)	0.277	1.397 (0.779 to 2.505)
2019	395	8.6% (n=34)		

threshold for doing the procedure is raised it becomes more likely to miss malignant cases which may not present with high-risk symptoms. Such a move was unfortunately necessary during the worst of the pandemic.

This study demonstrates that cytopathology services in the West of Ireland were clearly impacted by the COVID-19 pandemic. Reduced access to both exfoliative and FNA cytology services has led to a notable decrease in overall diagnostic cytology provision, while the provision of diagnostic services to the most high-risk cases appears to have been maintained. The department has successfully maintained the absolute volume of cytology positive for malignancy to a level that would have been expected pre-COVID-19, except for certain procedures such as BAL. This reflects a successful triage of patients at most risk of malignancy and in need of diagnostic cytology during 2020.

There is a clear need to resume cytology services to full capacity as soon as possible to avoid delayed diagnoses of malignancy and the associated morbidity/mortality.

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