

## The effect of the COVID-19 pandemic on skin cancer surgery in the United Kingdom: a national, multi-centre, prospective cohort study and survey of Plastic Surgeons

Editor

The COVID-19 pandemic has negatively affected all skin cancer treatment. A national audit of skin cancer excisions by Plastic Surgeons was adapted to establish what effect the pandemic had on the provision and delivery of skin cancer treatment in the United Kingdom.

Throughout 'lockdown' (March 16<sup>th</sup> – June 14<sup>th</sup> 2020) a prospective cohort of patients undergoing non-melanoma skin cancer (NMSC) surgery was undertaken. Retrospective data was collected on melanoma surgery. Data from immediately prior to lockdown (March 16<sup>th</sup> – 22<sup>nd</sup>) served as a control as normal NHS activities were undertaken during this time. Consecutive monthly surveys of Plastic Surgeons confirmed trends.

Data on 2050 patients from 32 Plastic Surgery units were included (Table 1). Surveys were received from 34 Plastic Surgery units. The median number of general anaesthetic (GA) lists per week per institution fell from 3 pre-lockdown to 0.5 in April ( $p < 0.0001$ ) and did not reach pre-lockdown levels in June. Local anaesthetic (LA) lists were reduced in April ( $p = 0.001$ ) and May ( $p = 0.006$ ) but recovered in June ( $p = 0.91$ ). When GA lists did occur, they were often in private hospitals (31–43% May/June vs 0% pre-lockdown,  $p < 0.0001$ ).

The number of NMSC treated per week fell by 27–47% throughout April and May. Excision of Squamous cell carcinomas (SCCs) was prioritised over basal cell carcinomas (BCCs), and at the pandemics' peak SCCs comprised 71% of excisions (normal is 28% from an ongoing systematic review,<sup>1</sup>  $p < 0.0001$ ). High-risk

tumours were particularly affected; 77% of surgeons reported Mohs micrographic surgery stopped and 70% of surgeons experienced a reduced radiotherapy service. Many high-risk BCCs did not receive treatment and delays may necessitate wider excisions<sup>2</sup>. Incomplete excisions occurred in 6.0% (4.3% BCC, 8.6% SCC).

Despite prioritisation, SCC and melanoma treatment was affected. Only 26% (45/171) of melanoma patients with Breslow thickness  $\geq 0.8$  mm underwent sentinel lymph node biopsies (SLNB) during lockdown despite AJCC guidelines<sup>3</sup>. SLNB stopped according to 60% of surgeons in April. Delayed SLNB increases the false negative rate<sup>4</sup> and is inappropriate in head/neck and truncal melanomas<sup>5</sup>. SLNB upstages a proportion of melanomas who become eligible for immunotherapy. Most melanomas treated during the pandemic have missed out on being offered immunotherapy, and the long-term effect of this is unknown. Immunotherapy was severely reduced: only 8–15% of surgeons reported a normal service was running in May/June. Surveillance of SCC and melanoma stopped according to 10% of surgeons.

Two patients (0.7%) developed COVID-19 within 2-weeks of melanoma surgery (one LA and one GA who died from COVID-19). Data was not available for 220/501 patients so this must be interpreted cautiously; the high proportion of missing data may be because some patients are not followed up. The mortality from operating on patients with COVID-19 was recently reported as 26%<sup>6</sup>. That study was uncontrolled and likely at high-risk of selection bias for severe COVID-19; the study conducted when testing was only available for patients requiring hospital admission. For comparison, inpatient mortality

in non-surgical COVID-19 patients is identical<sup>7</sup>. Our study demonstrates that skin cancer surgery was safe during the pandemic as 92% was under LA and complication rates were low (Table 1).

Most changes were in-line with pandemic guidelines<sup>5</sup>, like increased use of absorbable sutures (53% pre-lockdown to 86% mid-June,  $p < 0.0001$ ) and decreased face-to-face reviews (face-to-face 100% pre-lockdown to 44–56%,  $p < 0.0001$  and telephone 12% pre-lockdown to 87–92%,  $p < 0.0001$ ).




This study demonstrates all skin cancer treatment was negatively affected by the COVID-19 pandemic. As the lockdown is reduced, skin cancer services should be resumed urgently, as the risk of untreated skin cancer may now be considered greater than COVID-19.

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### Conflicts of interest

All authors declare they have no potential conflicts of interest.

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Table 1 included patients undergoing skin cancer surgery during 'lockdown' for the COVID-19 pandemic

	Demographics	Operations	Histology outcomes	Clinical outcomes
<b>Non-melanoma skin cancer</b>	<b>Patients:</b> 1549  <b>Male: female (% male):</b> 966: 583 (62.4%)  <b>Mean age (SD):</b> 73.4 (12.6)	<b>Lesions excised:</b> 1847  <b>Anaesthetic:</b> Local – 1417 (97.7%) General – 29 (2.0%) Regional – 5 (0.3%) Unknown – 98  <b>Location:</b> Head & neck – 1275 (65.8%) Leg – 199 (10.3%) Trunk – 200 (10.3%) Arm – 90 (4.6%) Hand – 63 (3.3%) Foot – 16 (0.8%) Genitalia, perineum – 4 (0.2%)  <b>Reconstruction:</b> Direct closure – 1002 (54.8%) Skin graft – 538 (29.4%) Flap – 229 (12.5%) Other – 59 (3.3%) Unknown – 19  <b>Sutures:</b> Absorbable – 971 (69.8%) Non-absorbable – 188 (13.5%) Mixture – 232 (16.7%) Unknown – 158	<b>Histological diagnosis:</b> BCC – 800 (46.9%) SCC – 476 (27.9%) Benign – 147 (8.6%) AK – 86 (5.0%) Bowen's disease 39 (2.3%) Melanoma – 8 (0.5%) Other – 149 (8.7%) Awaited – 142  <b>Median tumour diameter (IQR):</b> All – 12.0 mm (7.0-19.8) BCC – 12.0 mm (7.0-19.0) SCC – 15.0 mm (10.0-23.5)  <b>High-risk* lesions:</b> BCC – 329 (41.1%) SCC – 304 (63.9%)  <b>Margins:</b> Clear – 1234 (94.0%) Involved – 79 (6.0%) Awaited – 534	<b>Complications:</b> Uncomplicated – 1166 (93.0%) Infection – 38 (3.0%) Bleeding – 16 (1.3%) Graft/flap failure for other reason – 16 (1.3%) Other – 18 (1.4%) Patient not followed up – 9 Awaited/unknown – 286  <b>Ongoing care:</b> No further treatment/clinical surveillance – 1359 (94.0%) Listed for re-excision – 59 (4.1%) Referral to radiotherapy – 24 (1.7%) Re-excision & radiotherapy – 3 (0.2%) Unknown – 160 Awaited – 242
<b>Melanoma</b>	<b>Patients:</b> 501  <b>Male: female (% male):</b> 272: 229 (54.2%)  <b>Mean age (SD):</b> 60.4 (17.5)	<b>507 operations (85 operations with multiple procedures):</b> Biopsy – 149 WLE – 344 SLNB – 71 Lymph node dissection – 28  <b>Anaesthetic:</b> Local – 390 (76.9%) General – 116 (22.9%) Regional – 1 (0.2%)  <b>Sutures:</b> Absorbable – 456 (93.1%) Non-absorbable – 25 (5.1%) Mixture – 9 (1.8%) Unknown – 17  <b>Reconstruction following WLE:</b> Direct closure – 269 (78.7%) Skin graft – 42 (12.3%) Local flap – 24 (7.0%) Other – 7 (2.0%) Unknown – 2	<b>Biopsy histological diagnosis:</b> Melanoma – 41 (27.9%) Melanoma in-situ – 12 (8.2%) Dysplastic naevus – 7 (4.8%) Benign – 79 (53.7%) Other – 4 (2.7%) BCC – 4 (2.7%) Awaited – 2  <b>WLE completely excised:</b> Yes – 311 (95.4%) No – 15 (4.5%) Awaited – 18  <b>SLNB outcome:</b> Negative – 48 (67.6%) Positive – 23 (32.4%)  <b>Lymph node dissection:</b> Residual disease present – 20 (76.9%) Absent – 6 (23.1%) Awaited – 2	<b>Develop COVID-19 post op:</b> No – 279 (99.3%) Yes – 2 (0.7%) Unknown – 220  <b>Complications:</b> Uncomplicated – 420 (92.1%) Seroma – 10 (2.2%) Infection – 9 (2.0%) Bleeding – 2 (0.4%) Other – 15 (3.3%) Patient not followed up – 2 Awaited/unknown – 43

Prospective patient data collected on non-melanoma surgical excisions during lockdown (March 16<sup>th</sup> – June 14<sup>th</sup> 2020) from 32 Plastic Surgery units. Retrospective patient data on melanoma surgery (March 23<sup>rd</sup> – June 14<sup>th</sup> 2020) from 20 Plastic Surgery units. A further 228 patients did not meet inclusion criteria (e.g. pre-clinical diagnosis other than skin cancer, incomplete demographic/operative details) and were excluded prior to analysis. Abbreviations used are AK = actinic keratosis, BCC = basal cell carcinoma, SCC = squamous cell carcinoma, SD = standard deviation, SLNB = sentinel lymph node biopsy, WLE = wide local excision. \*High-risk BCC and SCC were defined using national guidelines by the British Association of Dermatologists for SCC and the Royal College of Pathologists dataset for histopathological reporting of primary cutaneous BCC.

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