**Management of subcutaneous abscesses: Prospective cross-sectional study (MAGIC)**

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**Supplementary Methods**

*Assessment of between-unit variation*

To assess variation in abscess management between centres, patient-level factors associated with post-operative antibiotic prescribing, use of local anaesthetic, and abscess packing were identified using binary logistic regression models. All patient-level factors were considered for entry into multivariable models predicting antibiotic prescribing, anaesthetic type or abscess packing. Variables were entered into multivariable models using a stepwise approach to variable selection. After generation of final multivariable models, multilevel models, including the treating centre as a random effect and the original multivariable model of patient-level factors were generated. Residual and standard deviations of the random effects were examined and likelihood ratio tests were performed to identify differences in the models at the centre level.

**Supplementary Results**

*Choice of anaesthetic type*

Patient sex, diagnosis of hidradenitis, immunosuppression, abscess position and diameter, timing of presentation, and primary operator were associated with choice of anaesthetic type. On likelihood ratio testing, multilevel modelling including the treating hospital as the random effect in addition to patient-level variables, was significantly different to the multivariable model p<0.001 suggesting an effect of the centre on anaesthetic choice independent of case mix (Table S2)

*Post-operative antibiotic prescribing*

Patient sex, smoking status, presence of diabetes, abscess diameter, presence of cellulitis, antibiotics prior to surgery, previous surgical management of abscess, and timing of surgery were associated with the use of antibiotics after surgery. On likelihood ratio testing, multilevel modelling including the treating hospital as the random effect in addition to patient-level variables, was significantly different to the multivariable model p<0.001 suggesting an effect of the centre on antibiotic prescribing independent of case mix (Table S2)

*Abscess Packing*

previous surgical management of abscess, hidradenitis suppurative, abscess position, presence of cellulitis, setting of operation, and primary operator were associated with choice of whether to pack the abscess. On likelihood ratio testing, multilevel modelling including the treating hospital as the random effect in addition to patient-level variables, was significantly different to the multivariable model p<0.001 suggesting an effect of the centre on abscess packing independent of case mix (Table S2)

**Table S1 – Data Collection Periods**

|  |  |
| --- | --- |
| **Time Period** |  |
| Data Collection Period 1 | 08:00AM 1st Sept 2022 – 07:59AM 1st Oct 2022 |
| Data Collection Period 2 | 08:00AM 1st Oct 2022 – 07:59AM 1st Nov 2022 |
| Data Collection Period 3 | 08:00AM 1st Nov 2022 – 07:59AM 1st Dec 2022 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Anaesthetic Type (GA vs local) | Post-op Antibiotics (Yes vs No) | Abscess Packed (Yes vs No) |
|  |  | ***OR(Multivariable)*** | ***OR (multilevel)*** | ***OR(Multivariable)*** | ***OR (multilevel)*** | ***OR(Multivariable)*** | ***OR (multilevel)*** |
| Anaesthetic type | *GA* | - | - | - | - | - | - |
|  | *Local* | - | - | 2.78 (1.99-3.91, p<0.001) | 2.68 (1.84-3.92, p<0.001) | - | - |
| Sex | *Male* | - | - | - | - | - | - |
|  | *Female* | 0.66 (0.48-0.91, p=0.011) | 0.56 (0.39-0.82, p=0.003) | - | - | - | - |
| Smoking | *Current Smoker* | - | - | - | - | - | - |
|  | *Previous Smoker* | - | - | 1.49 (0.95-2.35, p=0.086) | 1.62 (0.99-2.65, p=0.053) | - | - |
|  | *Never Smoked* | - | - | 1.40 (1.02-1.92, p=0.036) | 1.51 (1.07-2.12, p=0.018) | - | - |
| Previous abscess surgery | *No* | - | - | - | - | - | - |
|  | *Yes* | - | - | 6.28 (1.31-46.06, p=0.034) | 6.86 (1.06-44.28, p=0.043) | 0.60 (0.41-0.89, p=0.011) | 0.53 (0.35-0.83, p=0.005) |
| Hidradenitis | *No* | - | - | - | - | - | - |
|  | *Yes* | 0.56 (0.28-1.05, p=0.080) | 0.52 (0.25-1.08, p=0.081) | - | - | 1.98 (0.87-5.03, p=0.125) | 2.14 (0.79-5.74, p=0.132) |
| Immunosuppression | *No* | - | - | - | - | - | - |
|  | *Yes* | 2.03 (0.93-4.42, p=0.074) | 3.09 (1.17-8.21, p=0.023) | - | - | - | - |
| Diabetes | *No* | - | - | - | - | - | - |
|  | *Yes* | - | - | 2.04 (1.38-3.06, p<0.001) | 2.12 (1.38-3.27, p=0.001) | - | - |
| Abscess Position | *Abdominal Wall - Anterior* | - | - | - | - | - | - |
|  | *Abdominal Wall - Posterior* | 0.76 (0.32-1.80, p=0.543) | 0.72 (0.27-1.93, p=0.518) | - | - | 1.72 (0.47-8.30, p=0.449) | 1.83 (0.42-7.92, p=0.421) |
|  | *Axilla* | 0.49 (0.23-1.01, p=0.056) | 0.38 (0.17-0.87, p=0.023) | - | - | 2.08 (0.64-8.09, p=0.244) | 2.15 (0.56-8.29, p=0.266) |
|  | *Buttock*  | 0.22 (0.11-0.44, p<0.001) | 0.14 (0.06-0.31, p<0.001) | - | - | 0.97 (0.39-2.37, p=0.955) | 1.21 (0.46-3.17, p=0.699) |
|  | *Groin* | 0.36 (0.18-0.70, p=0.003) | 0.29 (0.14-0.60, p=0.001) | - | - | 0.47 (0.20-1.08, p=0.079) | 0.60 (0.24-1.50, p=0.276) |
|  | *Lower Limb - Proximal* | 0.43 (0.16-1.06, p=0.075) | 0.30 (0.11-0.87, p=0.026) | - | - | 1.52 (0.41-7.34, p=0.559) | 1.76 (0.38-8.15, p=0.468) |
|  | *Pilonidal* | 0.11 (0.06-0.22, p<0.001) | 0.07 (0.03-0.15, p<0.001) | - | - | 1.00 (0.43-2.23, p=0.997) | 1.41 (0.58-3.44, p=0.445) |
|  | *Thorax - Anterior* | 1.63 (0.81-3.31, p=0.175) | 1.81 (0.79-4.13, p=0.159) | - | - | 0.30 (0.12-0.71, p=0.007) | 0.37 (0.14-0.96, p=0.042) |
|  | *Thorax - Posterior* | 1.27 (0.73-2.21, p=0.401) | 1.38 (0.73-2.61, p=0.324) | - | - | 0.86 (0.38-1.84, p=0.714) | 1.18 (0.51-2.75, p=0.700) |
|  | *Upper Limb - Proximal* | 0.78 (0.38-1.56, p=0.477) | 0.71 (0.32-1.57, p=0.398) | - | - | 0.42 (0.17-1.01, p=0.054) | 0.59 (0.22-1.58, p=0.292) |
| Abscess Diameter | *Mean (SD)* | 0.76 (0.70-0.82, p<0.001) | 0.72 (0.65-0.79, p<0.001) | 1.09 (1.02-1.16, p=0.009) | 1.12 (1.05-1.21, p=0.001) | - | - |
| Cellulitis | *No* | - | - | - | - | - | - |
|  | *Yes* | - | - | 2.34 (1.73-3.20, p<0.001) | 2.22 (1.58-3.13, p<0.001) | 1.58 (1.02-2.50, p=0.043) | 1.39 (0.85-2.28, p=0.194) |
| Timing of Presentation | *Daytime (0800-1659)* | - | - | - | - | - | - |
|  | *Out of hours/evening (1700-2159)* | 0.70 (0.46-1.07, p=0.108) | 0.70 (0.44-1.12, p=0.141) | - | - | - | - |
|  | *Out of hours/night (2200-0759)* | 0.55 (0.31-0.94, p=0.033) | 0.59 (0.31-1.10, p=0.095) | - | - | - | - |
| Antibiotics prior to presentation | *No* | - | - | - | - | - | - |
|  | *Yes* | - | - | 0.76 (0.58-1.00, p=0.055) | 0.83 (0.61-1.13, p=0.231) | - | - |
| Antibiotics between presentation and surgery | *No* | - | - | - | - | - | - |
|  | *Yes* | - | - | 3.81 (2.83-5.17, p<0.001) | 4.16 (2.97-5.84, p<0.001) | - | - |
| Timing of Surgery | *Surgery performed at first hospital presentation* | - | - | - | - | - | - |
|  | *Surgery performed at planned return presentation* | - | - | 0.59 (0.43-0.80, p=0.001) | 0.57 (0.40-0.81, p=0.002) | - | - |
| Surgical Setting | *Operating Room* | - | - | - | - | - | - |
|  | *Emergency Department* | - | - | - | - | 0.24 (0.06-1.11, p=0.054) | 0.17 (0.03-0.80, p=0.025) |
|  | *Ward/Treatment Area* | - | - | - | - | 0.56 (0.36-0.86, p=0.008) | 0.47 (0.28-0.79, p=0.004) |
| Primary operator  | *Consultant* | - | - | - | - | - | - |
|  | *Junior Surgical Trainee (FY1-CT2, Clinical Fellow)* | 0.41 (0.21-0.78, p=0.007) | 0.47 (0.21-1.03, p=0.058) | - | - | 0.39 (0.14-0.92, p=0.047) | 0.68 (0.24-1.95, p=0.478) |
|  | *Nurse practitioner* | 26.19 (4.58-502.93, p=0.003) | 27.68 (2.84-270.28, p=0.004) | - | - | 0.43 (0.13-1.30, p=0.145) | 0.70 (0.19-2.60, p=0.590) |
|  | *Senior Surgical Trainee (ST3-8, Senior Fellow)* | 0.22 (0.11-0.41, p<0.001) | 0.27 (0.12-0.59, p=0.001) | - | - | 0.77 (0.27-1.84, p=0.577) | 1.00 (0.35-2.86, p=1.000) |

**Table S2 – Models exploring centre-level variation**

*Multivariable models were developed to predict anaesthetic type, the use of post-operative antibiotics, and abscess packing, according to the Methods. Patient-level factors were run with and without a centre level variable (multivariable and multilevel models). P-values from likelihood ratio tests comparing models with and without centre level variables were: Anaesthetic type p<0.001, Post-operative antibiotics p<0.001, abscess packing p<0.001*

**Appendix S1 – Collaborative Authorship**

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