celiotomy retrospective analysis 2023

Gregg Griffenhagen

2023-08-22

#Model primary outcome of incisional infection vs variables that make sense:

```
## logistf(formula = incis_infect ~ enterot + bowel_resect + preop_antibio +
##     intraop_antibio + anes_time + recov_time + recov_qual, data = data)
##
## Model fitted by Penalized ML
## Coefficients:
##                         coef  se(coef) lower 0.95 upper 0.95      Chisq
## (Intercept)      -3.07028681 1.5848930 -8.0761574 -0.4334199 5.45704893
## enterotY          0.31639619 0.3473535 -0.3890697  1.0428758 0.76790682
## bowel_resectY     0.85271871 0.5160953 -0.2326142  1.9019128 2.39814349
## preop_antibioY   -0.06344311 0.3812145 -0.8673340  0.6931377 0.02593893
## intraop_antibioY  0.27488064 0.3604840 -0.4782285  0.9935478 0.53353307
## anes_time        -0.03215775 0.2452482 -0.5701393  0.4599259 0.01516658
## recov_time       -0.43064828 0.3624198 -1.2200117  0.3009104 1.25564089
## recov_qualfair    0.56984478 1.4575566 -1.6602129  5.4640992 0.16788863
## recov_qualgood    0.82158857 1.4424157 -1.3513259  5.7043849 0.38541124
## recov_qualpoor    0.55276356 1.5238535 -1.9517343  5.4977878 0.13903484
##                           p method
## (Intercept)      0.01948954      2
## enterotY         0.38086537      2
## bowel_resectY    0.12147934      2
## preop_antibioY   0.87204955      2
## intraop_antibioY 0.46512526      2
## anes_time        0.90198619      2
## recov_time       0.26247783      2
## recov_qualfair   0.68199510      2
## recov_qualgood   0.53472137      2
## recov_qualpoor   0.70924241      2
##
## Method: 1-Wald, 2-Profile penalized log-likelihood, 3-None
##
## Likelihood ratio test=7.147469 on 9 df, p=0.6217689, n=573
## Wald test = 242.8144 on 9 df, p = 0
```

##Note that none of the variables in the full model are significant. Backwards elimination removed all of the variables and resulted in a model of (incisional infection ~ 1). ## The next step would be to trial individual sets of variables that may be significant

First try enterotomy or resection:

```
## logistf(formula = incis_infect ~ enterot + bowel_resect, data = data)
```

```
##
## Model fitted by Penalized ML
## Coefficients:
##                     coef  se(coef) lower 0.95 upper 0.95    Chisq         p
## (Intercept)   -2.8986203 0.2777626 -3.4846616 -2.3863905      Inf 0.0000000
## enterotY       0.1969729 0.3320154 -0.4533046  0.8637653 0.350686 0.5537251
## bowel_resectY  0.6288751 0.3679076 -0.1316104  1.3306892 2.675592 0.1018975
##               method
## (Intercept)        2
## enterotY           2
## bowel_resectY      2
##
## Method: 1-Wald, 2-Profile penalized log-likelihood, 3-None
##
## Likelihood ratio test=2.816695 on 2 df, p=0.244547, n=608
## Wald test = 260.0242 on 2 df, p = 0
```

Antibiotic use:

```
## logistf(formula = incis_infect ~ preop_antibio + intraop_antibio,
##     data = data)
##
## Model fitted by Penalized ML
## Coefficients:
##                         coef  se(coef) lower 0.95 upper 0.95     Chisq         p
## (Intercept)      -2.6535176 0.2416686 -3.1600028 -2.2058539       Inf 0.0000000
## preop_antibioY   -0.1923760 0.3707555 -0.9570097  0.5159410 0.2720081 0.6019879
## intraop_antibioY  0.2232458 0.3571590 -0.5044835  0.9125981 0.3802123 0.5374896
##                  method
## (Intercept)           2
## preop_antibioY        2
## intraop_antibioY      2
##
## Method: 1-Wald, 2-Profile penalized log-likelihood, 3-None
##
## Likelihood ratio test=0.8727224 on 2 df, p=0.6463842, n=608
## Wald test = 263.0964 on 2 df, p = 0
```

Intraoperative antibiotic type or timing?

```
## logistf(formula = incis_infect ~ intraop_antibio_type + intraop_antibio_time,
##     data = data)
##
## Model fitted by Penalized ML
## Coefficients:
##                                        coef se(coef) lower 0.95 upper 0.95
## (Intercept)                      -2.0276552 1.509804 -6.9492252  0.3590186
## intraop_antibio_typeenro          0.8521640 2.211057 -4.5867321  6.3228231
## intraop_antibio_typeenro pmx      3.1262675 2.224000 -0.7271235  9.0795130
## intraop_antibio_typegent         -0.1733553 1.696205 -3.2901247  4.8818982
## intraop_antibio_typegent cefa     0.4182173 2.163217 -4.9820754  5.8289444
## intraop_antibio_typegent cefa pmx 0.7752851 2.209802 -4.6611909  6.2410962
## intraop_antibio_typegent pmx      0.8780849 1.765815 -2.3676022  5.9894662
```

```
## intraop_antibio_typemetro          3.0878280 2.216076 -0.7434176  9.0296809
## intraop_antibio_typep              0.9290429 2.224000 -4.5274058  6.4200251
## intraop_antibio_typepen           -0.5397908 1.705466 -3.6837188  4.5200993
## intraop_antibio_typepen cefa       3.1262675 2.224000 -0.7271235  9.0795130
## intraop_antibio_typepen clinda     0.8137246 2.208963 -4.6221299  6.2799616
## intraop_antibio_typepen enro       0.8906035 2.216076 -4.5551141  6.3695499
## intraop_antibio_typepen gent      -0.3729802 1.545718 -2.8664714  4.5698953
## intraop_antibio_typepen gent pmx  -1.2957788 2.063010 -6.6015610  4.0034149
## intraop_antibio_typepmx           -1.0430085 1.704269 -4.1811821  4.0115537
## intraop_antibio_typeppen enro      0.6599668 2.229826 -4.7993471  6.1500579
## intraop_antibio_time               0.1537578 0.322033 -0.8336830  0.7619085
##                                         Chisq         p method
## (Intercept)                       2.643998067 0.1039417      2
## intraop_antibio_typeenro          0.144969541 0.7033898      2
## intraop_antibio_typeenro pmx      2.467580700 0.1162167      2
## intraop_antibio_typegent          0.009898673 0.9207476      2
## intraop_antibio_typegent cefa     0.036626932 0.8482266      2
## intraop_antibio_typegent cefa pmx 0.120585065 0.7284008      2
## intraop_antibio_typegent pmx      0.264014843 0.6073752      2
## intraop_antibio_typemetro         2.433098745 0.1187979      2
## intraop_antibio_typep             0.169434250 0.6806151      2
## intraop_antibio_typepen           0.090372579 0.7637040      2
## intraop_antibio_typepen cefa      2.467580700 0.1162167      2
## intraop_antibio_typepen clinda    0.132711182 0.7156374      2
## intraop_antibio_typepen enro      0.157247850 0.6917031      2
## intraop_antibio_typepen gent      0.052235781 0.8192175      2
## intraop_antibio_typepen gent pmx  0.367328571 0.5444640      2
## intraop_antibio_typepmx           0.313089051 0.5757908      2
## intraop_antibio_typeppen enro     0.086070033 0.7692340      2
## intraop_antibio_time              0.170864602 0.6793445      2
##
## Method: 1-Wald, 2-Profile penalized log-likelihood, 3-None
##
## Likelihood ratio test=19.11204 on 17 df, p=0.3221394, n=167
## Wald test = 73.84055 on 17 df, p = 4.657713e-09
```

Anesthesia variables?

```
## logistf(formula = incis_infect ~ anes_time + recov_time + recov_qual,
##     data = data)
##
## Model fitted by Penalized ML
## Coefficients:
##                       coef  se(coef) lower 0.95 upper 0.95      Chisq
## (Intercept)    -3.7192307 1.5532395 -8.6806985 -1.2507024 10.2640622
## anes_time       0.2581382 0.1739744 -0.1153288  0.5988728  1.8955356
## recov_time     -0.4142717 0.3631276 -1.1915428  0.3032292  1.1893804
## recov_qualfair  0.8651348 1.4603742 -1.2984640  5.7471962  0.4341948
## recov_qualgood  1.1406629 1.4421388 -0.9523914  6.0096151  0.8563290
## recov_qualpoor  0.8098640 1.5277337 -1.6355198  5.7415443  0.3244785
##                          p method
## (Intercept)    0.001356467      2
## anes_time      0.168578877      2
```

```
## recov_time     0.275454567      2
## recov_qualfair 0.509937780      2
## recov_qualgood 0.354768046      2
## recov_qualpoor 0.568928574      2
##
## Method: 1-Wald, 2-Profile penalized log-likelihood, 3-None
##
## Likelihood ratio test=3.715463 on 5 df, p=0.5910646, n=573
## Wald test = 245.202 on 5 df, p = 0
```

Association with NSAID use?

```
## logistf(formula = incis_infect ~ postop_nsaid_num + postop_nsaid_days,
##     data = data)
##
## Model fitted by Penalized ML
## Coefficients:
##                         coef  se(coef)  lower 0.95 upper 0.95      Chisq
## (Intercept)       -3.4935737 0.4604556 -4.42446188 -2.5968871 55.5636104
## postop_nsaid_num   0.1331680 0.3121734 -0.51657910  0.7320001  0.1740918
## postop_nsaid_days  0.1241185 0.0335200  0.06457981  0.2071685 21.3085348
##                                 p method
## (Intercept)       9.048318e-14      2
## postop_nsaid_num  6.765006e-01      2
## postop_nsaid_days 3.909869e-06      2
##
## Method: 1-Wald, 2-Profile penalized log-likelihood, 3-None
##
## Likelihood ratio test=23.75979 on 2 df, p=6.928314e-06, n=604
## Wald test = 248.4323 on 2 df, p = 0
```

None of these produced significant independent predictors...

How about modeling postop reflux?

```
## logistf(formula = postop_reflux ~ anes_time + bowel_resect +
##     enterot + preop_antibio + intraop_antibio + postop_antibio_days +
##     postop_antibio_addnl + postop_nsaid_num + postop_nsaid_days +
##     postop_lido + postop_alpha2 + postop_butor + postop_ket,
##     data = data)
##
## Model fitted by Penalized ML
## Coefficients:
##                              coef   se(coef)  lower 0.95  upper 0.95
## (Intercept)           -5.08839704 0.88976713 -7.36033423 -3.56885514
## anes_time              0.17112722 0.15248573 -0.13104623  0.47402240
## bowel_resectY          0.11465795 0.33996989 -0.56567985  0.78166116
## enterotY               0.03485143 0.22016023 -0.39996262  0.47231700
## preop_antibioY        -0.02666645 0.24296885 -0.51297966  0.45072952
## intraop_antibioY       0.22887053 0.23872242 -0.24794233  0.69816697
## postop_antibio_days   -0.03488200 0.04368450 -0.12574426  0.04923036
## postop_antibio_addnlY  0.42085195 0.23112808 -0.03711106  0.87865840
```

```
## postop_nsaid_num       0.23346662 0.20263222 -0.17089144  0.63263670
## postop_nsaid_days      0.03338072 0.04378197 -0.05226941  0.12299927
## postop_lidoY           2.79537712 0.81316965  1.47836085  4.97921064
## postop_alpha2Y         0.21635780 0.24510746 -0.27021236  0.70225838
## postop_butorY          0.46184987 0.25292442 -0.03719759  0.96580061
## postop_ketY           -0.62276688 0.27170387 -1.17795137 -0.09731420
##                             Chisq            p method
## (Intercept)                   Inf 0.000000e+00      2
## anes_time              1.23598215 2.662468e-01      2
## bowel_resectY          0.11147317 7.384731e-01      2
## enterotY               0.02462709 8.752999e-01      2
## preop_antibioY         0.01182594 9.134031e-01      2
## intraop_antibioY       0.89502182 3.441201e-01      2
## postop_antibio_days    0.63706327 4.247762e-01      2
## postop_antibio_addnlY  3.24587273 7.160355e-02      2
## postop_nsaid_num       1.29201258 2.556774e-01      2
## postop_nsaid_days      0.57313642 4.490153e-01      2
## postop_lidoY          28.21790174 1.083974e-07      2
## postop_alpha2Y         0.76261416 3.825117e-01      2
## postop_butorY          3.28954797 6.972221e-02      2
## postop_ketY            5.43999167 1.968076e-02      2
##
## Method: 1-Wald, 2-Profile penalized log-likelihood, 3-None
##
## Likelihood ratio test=73.02386 on 13 df, p=2.217373e-10, n=602
## Wald test = 145.1962 on 13 df, p = 0
```