Percutaneous image-guided gastrostomy tube (PIGG) complications and tube malfunctions in the first 24 weeks following placement: a 3-year retrospective review

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Purpose

• To determine the complication and tube malfunction rate of percutaneous image-guided gastrostomy tube (PIGG) placement prior to the initial routine 24-week change in order to evaluate procedure safety and determine optimal follow-up interval for the first tube change.
Material and Methods

• PIGG placements from July 2012 to July 2015 were retrospectively reviewed for indications, risk factors, time to first follow-up, reason for follow-up, type of complication, and type of tube malfunction (clogged, displaced, or leaking) if present.

• Univariate and multivariate logistic regression analyses were conducted to identify risk factors for complications and tube malfunctions using IBM SPSS Software v.25.

• 241 PIGG placements were attempted and 239 were successful.

• Gender distribution:
  • 109 Females
  • 120 Males

• Age distribution (years):
  • Median: 69
  • STD: 15.6
  • Range: 22-104
Material and Methods

• Indications included (N=239):
  • Neuromuscular dysfunction: 113 (47%)
  • Head and neck cancer: 57 (24%)
  • Other cancer with malnutrition: 36 (15%)
  • Malnutrition: 19 (8%)
  • Gastric remnant access: 14 (6%)

• Analyzed risk factors (N=239):
  • Immunosuppression: 91 (38%)
  • Neutropenia (ANC < 1.5k): 23 (10%)
  • Patients with no risk factors: 125 (52%)
Material and Methods

• 148 (62%) patients were seen for routine change or tube malfunction.
• 19 (8%) were lost to follow-up.
• 72 (30%) were deceased before follow-up unrelated to the procedure:
  • 38 due to progression of neuromuscular dysfunction
  • 30 due to progression of malignancy
  • 4 due to surgical complications in patients with malnutrition

• ALL head and neck cancer patients undergoing PIGG placement received peri-procedural IV antibiotics due to increased risk of infection in this population as described in prior studies\(^1\), while other groups did not.
Results

• There were 9 (3.7%) total complications of the 241 attempted procedures.
• 2 (0.8%) were major (required surgical intervention):
  • 1 tube placement into the peritoneal cavity
  • 1 fracture of the access tract serial dilator
• 7 (2.9%) were minor (site infections which resolved with oral antibiotics):
  • 2 patients with gastric remnant access
  • 4 patients with head and neck CA receiving chemotherapy (3 of the 4 on chemotherapy were also neutropenic)
  • 1 patient with ALS
Results

• 6 of 7 (86%) infections occurred within 7 weeks:
  • 1 infection occurred at 44 weeks in a patient who did not show up for routine 24 week change

• Univariate and multivariate logistic regression identified gastric remnant access and neutropenia as independent risk factors for infection.

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>P-Value</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastric remnant Access</td>
<td>0.005</td>
<td>0.024</td>
<td>0.002-0.315</td>
</tr>
<tr>
<td>Neutropenia</td>
<td>0.026</td>
<td>0.113</td>
<td>0.016-0.772</td>
</tr>
</tbody>
</table>
Results

• Univariate analysis of head and neck cancer approached statistical significance:
  • P-value: 0.054
  • Odds ratio: 0.222 (95% CI: 0.048-1.023)

• Multivariate analysis of head and neck cancer remained INSIGNIFICANT:
  • P-value: 0.077
  • Odds ratio: 0.126 (95% CI: 0.013-1.249)
Results

• 25 of 134 (18.7%) tubes seen at follow-up required early tube exchange before 28 weeks post placement:
  • 134 seen at follow-up and 91 lost to follow-up or deceased by 28 weeks
  • 14 seen at follow-up after 28 weeks

• 19 of 25 (76%) tube malfunctions occurred within the first 13 weeks following placement.

• 7 of 9 (78%) clogged tubes presented by week 9.

• 6 of 9 (67%) displaced tubes presented by week 13.

• 6 of 7 (85%) leaking tubes presented by week 13.
## Results

<table>
<thead>
<tr>
<th>Malfunctions</th>
<th>Early (&lt;14 weeks)</th>
<th>Late (14-28 weeks)</th>
<th>P-Value</th>
<th>OR</th>
<th>CI 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Malfunctions</td>
<td>19</td>
<td>6</td>
<td>&gt;0.000</td>
<td>0.124</td>
<td>0.053-0.289</td>
</tr>
<tr>
<td>Clogged</td>
<td>7</td>
<td>2</td>
<td>0.003</td>
<td>0.085</td>
<td>0.017-0.420</td>
</tr>
<tr>
<td>Displaced</td>
<td>6</td>
<td>3</td>
<td>0.050</td>
<td>0.0309</td>
<td>0.096-1.000</td>
</tr>
<tr>
<td>Leaking</td>
<td>6</td>
<td>1</td>
<td>0.006</td>
<td>0.101</td>
<td>0.020-0.514</td>
</tr>
</tbody>
</table>
Results

No. of Malfunctions Over Time (each week and cumulative)

R² = 0.9815

50%

Week

No. of Malfunctions

PennState Health
Milton S. Hershey Medical Center
PennState College of Medicine
Conclusions

• PIGG placement is safe with a low complication rate.
• Site infection rates were significantly higher in patients with gastric remnant access or neutropenia.
• The majority of PIGG malfunctions occurred within 13 weeks of placement.
• In order to reduce a significant number (50%) of early exchanges due to tube malfunctions, initial PIGG exchange would need to occur by 8 weeks.
• This may not be feasible due to patient inconvenience, limited resources, and health care costs.
• Therefore, 24-weeks may be an appropriate interval for scheduling the first routine PIGG exchange, if exchange by 8 weeks is not logistically feasible.
References


