

Incidence and Impact of Contrast-enhanced Fluoroscopic Studies to Evaluate Gastrostomy-button Complications in Pediatric Patients

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Purpose: Complications associated with gastrostomy buttons (g-buttons) such as leaking or dislodgment are common and often require contrast-enhanced fluoroscopic studies. These procedures incur significant medical costs and radiation exposure. We sought to determine the incidence and costs associated with g-button-related fluoroscopic studies at our institution.

Methods: A retrospective review of patients who underwent a fluoroscopic g-button study at Children's Hospital Colorado from 2015-2020 was conducted. Patients were stratified based on the reason for the study and compared using frequencies, means, and Fisher's exact or Kruskal-Wallis tests. Radiation dosages and charges associated with study encounters were calculated.

Results: A total of 384 g-button studies were included. The most common reason was dislodgement (27%) followed by inability to tolerate feeds (22%), routine replacement (19%), and leaking (12%). Studies for dislodgment and routine replacement showed 6.3% of g-buttons were improperly replaced and 4.4% required surgery. There was a significant difference in the age of the tract (11.88 vs 44.53, $p=0.02$) and hospital admission (66.7% vs 5.5%, $p<0.001$) in those with improperly replaced g-buttons. The average radiation dose administered per study was 14.99 (mGy) and the median total charge was \$3,333.45.

Conclusion: Contrast-enhanced fluoroscopic g-button studies are commonly performed for dislodgement and other complications. Importantly, 6.3% of g-buttons were found to be malpositioned following replacement, reinforcing the importance of a fluoroscopic study after a dislodgement especially among those <6 weeks out from initial placement.

Significance: G-button placement is a common pediatric surgical procedure. An improved method for securing g-buttons may reduce the number of dislodgment episodes, leakage, ED visits, radiation exposure, and overall costs.

Table 1 Demographics and Clinical Characteristics Associated with G-button Studies

Reason for Contrast-enhanced Fluoroscopic G-button Study									
	Dislodged Tube (N=105)	Leaking Tube (N=47)	Inability to Tolerate Feeds (N=86)	Pain Around Tube (N=29)	Routine placement, replacement, size change (N=72)	Suspected Infection (N=14)	Suspected Obstruction (N=7)	Suspected Malposition (N=5)	Other Reason (N=19)
Gender									
Female	41 (39%)	21 (45%)	37 (43%)	14 (48%)	39 (54%)	9 (64%)	4 (57%)	2 (40%)	11 (58%)
Male	64 (61%)	26 (55%)	49 (57%)	15 (52%)	33 (46%)	5 (36%)	3 (43%)	3 (60%)	8 (42%)
Ethnicity									
Hispanic/Latino	37 (35%)	18 (38%)	23 (27%)	11 (38%)	26 (36%)	4 (29%)	2 (29%)	0 (0%)	6 (32%)
Not Hispanic/Latino	65 (62%)	27 (57%)	58 (68%)	17 (59%)	46 (64%)	10 (71%)	5 (71%)	5 (100%)	12 (63%)
Unknown	3 (3%)	2 (4%)	4 (5%)	1 (3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (5%)
Age at Surgery (yrs)	2.9 (4.84)	4.2 (7.13)	4.0 (5.97)	5.7 (5.09)	5.0 (6.97)	3.3 (4.05)	3.0 (4.02)	2.4 (3.7)	4.7 (8.7)
Age at G-button Study (yrs)	4.0 (5.6)	8.1 (8.9)	6.4 (7.2)	7.2 (4.5)	6.3 (7.5)	3.9 (3.9)	5.0 (5.6)	5.2 (6.3)	6.6 (8.9)
Age of Tract (days)	397 (818)	1411 (2191)	831 (1432)	464 (768)	439 (991)	189 (223)	752 (1163)	1052 (2263)	614 (1010)
Inpatient Status									
Clinic	24 (23%)	13 (28%)	36 (42%)	18 (62%)	41 (57%)	6 (42%)	3 (43%)	3 (60%)	3 (16%)
ED	52 (49%)	9 (19%)	19 (22%)	4 (14%)	4 (6%)	4 (29%)	2 (29%)	1 (20%)	4 (14%)
Inpatient	29 (28%)	25 (53%)	30 (35%)	7 (24%)	27 (37%)	4 (29%)	2 (29%)	1 (20%)	12 (64%)
Required Admission									
Yes	7 (9%)	2 (9%)	9 (16%)	1 (4%)	1 (2%)	1 (11%)	1 (20%)	1 (25%)	0 (0%)
No	69 (91%)	21 (91%)	46 (84%)	21 (96%)	44 (98%)	8 (89%)	4 (80%)	3 (75%)	7 (100%)
Radiation Dose (mGY)	5.95 (13.54)	21.97 (67.5)	31.12 (145.56)	20.36 (60.76)	10.33 (36.93)	2.27 (2.95)	0.60 (0.85)	14.97 (17.46)	3.18 (7.51)
Total Charge to Patient	\$3,111.88 [2,268.05, 61,645.76]	\$25,327.87 [1,224.16, 401,515.50]	\$3,680.73 [819.0, 71,969.95]	\$1,519.740 [880.0, 51,528.11]	\$1,620.61 [919.50, 72,680.89]	\$13,650.46 [1568.25, 86,972.62]	\$7,234.6 [797.5, 27,884.38]	\$1,794.0 [1,161.21, 856,465.48]	\$84,955.5 [3,060.39, 241,655.44]