of dog bites to the upper extremities \( (P < 0.001, B = +1.9\% \text{ per year}) \) and lower extremities \( (P = 0.002, B = +1.6\% \text{ per year}) \) gradually increased as patients became older.

Overall, 8.0\% (n = 4515) patients required operative intervention, and dog bites to various portions of the body had different risk of requiring surgery. Dog bites isolated to the head \( (P < 0.001, \text{OR} = 2.6, 95\% \text{CI} 2.4–2.9) \) were significantly more likely to require operative intervention, whereas isolated dog bites to the torso \( (P < 0.001, \text{OR} = 0.5, 95\% \text{CI} 0.4–0.6) \), upper extremity \( (P < 0.001, \text{OR} = 0.4, 95\% \text{CI} 0.4–0.5) \), and lower extremity \( (P < 0.001, \text{OR} = 0.3, 95\% \text{CI} 0.3–0.5) \) were significantly less likely to require operative intervention. Patients with dog bites to multiple anatomic regions were more likely to require operative intervention \( (P < 0.001, \text{OR} = 2.6, 95\% \text{CI} 2.4–2.8) \).

Median hospital billed charges after dog bites was $1933, and patients who required operative intervention were billed significantly more \( (P < 0.001, \$26,080 \text{ versus } \$1761) \). Pediatric dog bites to multiple anatomic locations had significantly higher admission charges \( (P < 0.001, \$3005 \text{ versus } \$1886) \). Among dog bites isolated to one anatomic location, dog bites to the head were billed the most (median $2098), while dog bites to the torso were billed the least (median $1390).

CONCLUSIONS: Quarantine circumstances have kept children at home longer, while parents are working from home and concurrently tasked with around-the-clock child supervision. These influences may have contributed to pediatric dog bites significantly increasing during the COVID-19 pandemic. Further research will be focused on elucidating the socioeconomic and demographic factors associated with pediatric dog bite injuries as families differentially cope with these novel challenges.

Cost-utility Analysis of Surgical Treatments for Breast Cancer-related Lymphedema

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PURPOSE: Breast cancer-related lymphedema (BCRL) is a chronic and debilitating complication of breast cancer treatment affecting over one-third of breast cancer patients.\(^1\) BCRL is associated with significant physical, psychological, and financial burden, which can negatively impact a patient’s quality of life.\(^1,2\) Traditional management of BCRL is complete decongestive therapy, a collection of lifelong interventions that can be time-consuming, labor-intensive, and expensive.\(^3\) Surgical interventions for BCRL such as lymphaticovenular bypass (LVB) and vascularized lymph node transfer (VLNT) have been increasingly investigated as effective alternatives to decongestive therapy.\(^4\) In this study, we conducted a cost-utility analysis to compare the costs and quality-of-life measures for patients undergoing surgical lymphedema treatments.

METHODS: This is a single-center, retrospective study. We identified adult women undergoing surgical BCRL treatment with LVB and VLNT at Cleveland Clinic Foundation between 2016 and 2020. Patient-reported outcomes data were obtained through preoperative and postoperative Patient-Reported Outcomes Measurement Information System surveys. We utilized institutional reimbursement rates to calculate procedural costs. Average utility scores were obtained and converted to quality-adjusted life years. A decision tree with rollback analysis to identify the most cost-effective decision was generated. Negative outcomes in both treatment arms included costs of conservative treatment. An incremental cost-utility ratio was subsequently calculated. Sensitivity analyses were conducted to evaluate our findings.

RESULTS: The study included 6 women undergoing LVB and 4 women undergoing VLNT. The average age was 58 years (SD = 8). Average time between lymphedema diagnosis and surgical intervention was 7 years (SD = 7). The calculated quality-adjusted life years for LVB and VLNT were 17.70 years and 17.00 years, respectively. The estimated cost for LVB was $31,859, while the estimated cost for VLNT was $39,137. The calculated incremental cost-utility ratio of LVB to VLNT was −10,397. Rollback analysis identified LVB as the more cost-effective strategy.

CONCLUSIONS: This study provides insight to the comparative effectiveness of LVB and VLNT as treatments for BCRL. We demonstrated that LVB is a more cost-effective treatment option for BCRL than for VLNT. Regardless of treatment modality, lymphedema incurs significant financial burden for patients, underscoring the need for policy-driven change to decrease lymphedema costs. Further investigation is necessary to examine targeted management as well as prevention strategies for BCRL.
incorporating both payer and provider perspectives will also help elucidate variations in cost.

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Meningomyelocele Repair: An Algorithmic Approach based on 5-year Review and Systematic Review of the Literature

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**Purpose:** We propose a reconstructive algorithm based on retrospective review of meningomyelocele (MM) repairs at our institution and systematic review of the literature.

**Methods:** A retrospective review of human infants undergoing MM repair over 5 years at a single children’s hospital. Location and size of defect, major wound complications (MWC) (return to the operating room), minor wound complications (mWC) (any wound breakdown treated without return to operating room, superficial infection, or CSF leak), and follow up were recorded. Interviews of neurosurgeons and plastic surgeons were performed on approach MMC repairs.

A systematic review of the literature was performed to evaluate all reconstructions for MM. Inclusion criteria included articles that discussed reconstructive technique, age, defect location and size, and complications (MWC and mWC). Exclusion criteria included age greater than 1 year, articles published prior to 1984, and non-English language. Additionally, articles missing individual patient data, reconstructions using greater than two flaps, or use of alloplastic/xenograft were excluded. Flaps were categorized by reconstructive method: primary closure with and without fascial flaps (PC), random pattern flap (based on unnamed vessels) (RP), VY advancement flap (VY), perforator flap (based on unnamed vessels) (PF), myocutaneous flap (defined muscle flap or perforators off named muscle), and keystone island perforator flap (islanded fasciocutaneous flap based on random regional musculocutaneous perforators) (KIPF).

**Results:** In our cohort, there were 39 patients who underwent repair with three MWC (8%). An estimated 79% of cases (n = 31) were performed by neurosurgery with PC. Two (5%) had an MWC. Plastic surgery was consulted for 20% of the cases (n = 8), with 1 patient (13%) having an MWC. Of the three total MWC for MM repair, two were located in the lumbosacral area and one in the lumbar area. All complications occurred with defects greater than 50 cm². On interviews of neurosurgeons, plastic surgery consultation occurs when there is a paucity of soft tissue (lack of adequate skin or redundant tissue) or subsequent wound breakdown.

Upon systematic review, 551 articles were screened with 95 articles assessed for eligibility. Twenty-seven articles were further reviewed and included for qualitative synthesis. Two hundred fifty-six patients underwent MM repair: 41 PC (16%), 71 RP (28%), 25 VY (10%), 61 PF (24%), 26 myocutaneous flap (10%), and 32 KIPF (13%). MM were located at thoracic (n = 6), thoracolumbar (n = 84), lumbar (n = 15), lumbosacral/sacral (n = 151). Lowest MWC were associated with KIPF (6%), RP (7%), myocutaneous flap (11%), VY (13%), PC (15%), and PF (17%), respectively. A majority of MWC were in the lumbosacral/sacral region (90% of MWC). In this region, PC was used for average defect [9.7 cm² (3–28.3 cm²) with 16% MWC]. The only reconstructions for sacral MM were PF (n = 2) and KIPF (n = 7). PF average defect was 6.8 cm² (3.5–10 cm²) with no MWC and 1 mWC. KIPF average defect was 43.7 cm² (8–100 cm²) with 1 MWC and 3 mWC (3% and 9%, respectively).

**Conclusions:** Plastic surgery consultation should be strongly considered for MM with defects in the lumbosacral/sacral region. KIPF and PF should be considered for sacral defects.