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Tapping into ascites: Service evaluation of elective day-case paracentesis

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Abstract

Background: Ascites is the most common complication of liver cirrhosis. Large-volume paracentesis necessitates hospital admissions. Elective day-case paracentesis was introduced into Sandwell and West Birmingham NHS Trust in July 2019 to reduce inpatient bed occupancy. It was established under the condition of regular service review to ensure ongoing safety and cost savings. This is a service evaluation following a 2019 review.

Objective: To evaluate the complication rates and cost savings of day-case paracentesis in patients with ascitic liver disease.

Methodolog: Six months' cumulative data was collected retrospectively via the hospital's online clinical system for all day-case paracentesis between January and October 2020, excluding the coronavirus lockdown period. Cost savings were based on avoidance of inpatient bed days (average 3.5 days in 2017-2018) per paracentesis, cost per day-case and any readmission bed days within 7 days. Complications requiring hospital admissions or additional interventions were reviewed.

Results: 9 patients with a total of 28 episodes of day-case paracentesis were included. The average length of stay was found to be 0.48 days, similar to the 2019 service evaluation. 3 of 28 were admitted with 2 requiring albumin cover overnight and 1 found to be anaemic and thrombocytopenic requiring transfusion. Therefore, 25 inpatient admissions were avoided. Using data from NHS Improvement, cost savings per inpatient admission avoided was calculated to be £1,899. Hence, £47,475 was saved over this 6-month period. No significant complications were found.

Conclusion: Day-case paracentesis at our trust resulted in significantly reduced healthcare costs without compromising patient safety.

Background

Liver disease has been on the rise since 2011, with 138.3 per 100,000 people being admitted to hospital with it as a primary diagnosis as of 2019 [1]. Ascites is the most common complication of liver cirrhosis and managing large-volume paracentesis necessitates hospital admissions [2,3]. Paracentesis is the use of a drain to remove excess peritoneal fluid from the abdomen to be used in both the diagnosis and management of ascites [4]. This procedure can provide symptomatic relief from abdominal discomfort and tense ascites when diuretics are ineffective. Elective day-case paracentesis was introduced into Sandwell and West Birmingham NHS (National Health Service) Trust, UK in July 2019 to reduce inpatient bed occupancy. It was established under the condition of regular service review to ensure ongoing safety and cost savings. This is a service evaluation following a 2019 review.

Objective

The aim of this service evaluation is to evaluate the complication rates and cost savings of day-case paracentesis in patients with ascitic liver disease.

Methodology

This project was registered and approved by the local clinical audit department. Six months of cumulative data was collected retrospectively via the hospital's online clinical system for all day-case paracentesis between January and October 2020. The coronavirus lockdown period was excluded from the data collection as the service was unavailable. The data collected included: patient demographics, date and time of admission and discharge, volume drained, and complications. Cost savings were calculated based on avoidance of inpatient bed days per paracentesis compared to the 2017-18 average (3.5 days using inpatient paracentesis as per previous practice), cost per day-case, and any readmission bed days within 7-days. Complications requiring hospital admissions or additional interventions were also reviewed.

Results

Nine patients with a total of 28 episodes of day-case paracentesis were included. The average age was 64.6 years (53 to 76). The average fluid drained was 11.2 litres (ranging from 3 to 18.4 litres). There were six males and three females included. The aetiology of liver disease included five alcoholic liver disease, three non-alcohol steatohepatitis and one hepatitis B.

The average length of stay was found to be 0.48 days. This is similar to the 2019 service evaluation (0.50 days) and less than the 3.5 days average of 2017-18 when the inpatient paracentesis service was used. Three episodes out of 28 were admitted with two requiring albumin cover overnight and one incidentally found to be anaemic and thrombocytopenic requiring transfusion. Therefore, 25 episodes of inpatient admissions were avoided.

The costs for the beds were derived from NHS Improvements [5]. The cost for a bed for the day-case service was £742. The cost for a bed for the non-elective inpatient service was £1603 with excess bed days costing £346 per day. The average stay for an inpatient paracentesis was 3.5 days and therefore we calculated the cost to be £1603 plus 3 extra bed days so 3x £346 which totals £2641. This means the cost savings for each episode of day-case paracentesis was calculated to be £2641 - 742 which is £1899 [5]. Hence, over this 6-month period, the total savings were £1,899 x 25 episodes = £47,475. No significant complications were found.

Discussion

Though the true prevalence of ascites in the UK is unknown, in a 10-year follow-up study [6], out of 293 patients, 58% of those who developed liver cirrhosis also developed ascites. If 58% of patients require symptomatic relief despite the use of diuretics, there may be a high demand for the NHS to treat these patients. Our evaluation confirmed that day-case paracentesis is safe and cost saving.

The length of stay for the day-case paracentesis was approximately the same as the previous cycle so therefore the service has been consistent. Patients were drained regularly, once a month, therefore they did not have to wait until their symptoms were severe before attending A&E (Accident and Emergency). Planned and pre-emptive draining enhances the patient's quality of life compared to going through A&E triage in addition to reducing the burden on A&E. Decreased length of stay reduces admission costs, the risk of exposure to hospital-acquired infections, and other potential complications [7-9].

The sample size of 9 patients with a total of 28 episodes is limited and therefore constant review is necessary to monitor for complications. It would also be beneficial to introduce this service into other hospitals in order to increase the sample size and to get a more representative population.

A proforma including a pre-procedure checklist can aid with accurate documentation and ensure appropriate post-procedure care is performed for every patient. This would also simplify the data collection in future service reviews.

Harding *et al* [10] explored day-case paracentesis in patients with ovarian cancer. Their study found day-case paracentesis is safe, improves quality of life, reduces hospital stay, and is cost-effective. This reinforces the findings of this service evaluation.

Hudson *et al* [11] showed that patients receiving day-case large-volume paracentesis services in their last year of life had reduced costs (- £4240), probability of early readmission (odds ratio 0.35), pressure on A&E, and a lower probability of dying in hospital (odds ratio 0.31), in comparison to those in an unplanned setting.

There have been reports on the use of long-term peritoneal drains such as the PleurX catheter that can help patients manage their condition at home. It allows regular drainage of smaller volumes (500ml) which reduces symptoms and avoids potential complications from large-volume paracentesis such as paracentesis-induced circulatory dysfunction [12]. The patient will have to be educated on how to use the drain and how to manage their condition safely. This limits hospital admissions and therefore reduces the risk of potential complications. Tapping *et al* [13] studied the use of PleurX over a 4-year period in 28 patients with refractory symptomatic malignant ascites. They found the method was safe, effective, and relatively simple. The

use of long-term drains should be considered in patients requiring frequent drainage as it gives them control of their condition and reduces the burden on hospitals. However, this would require local expertise in the insertion of the PleurX catheter, patients' ability to manage the catheter at home, and community healthcare support should they be required. As a result of these potential challenges, day-case paracentesis would remain a clinically safe and cost saving option.

Conclusion

Day-case paracentesis at our hospital resulted in substantially reduced healthcare costs compared to inpatient paracentesis without compromising patient safety. This service review should be continued annually to ensure high standards of patient care are maintained.

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