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Diagnostic accuracy of magnetic resonance imaging before and after treatment in patients undergoing neoadjuvant chemoradiotherapy for rectal adenocarcinoma

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Introduction

Neoadjuvant chemoradiotherapy (CRT) is used widely in patients with rectal adenocarcinoma. There is debate over its use given its significant side effects and unpredictable response rate. Pretreatment magnetic resonance imaging (MRI) is the main tool in the prediction of tumour staging and it guides use of neoadjuvant CRT but MRI following CRT is often used to plan surgery. We investigated the accuracy of MRI before and after CRT as well as its role in guiding treatment.

Methods

Consecutive patients undergoing neoadjuvant CRT and potentially curative resection for rectal adenocarcinoma in a single centre over a ten-year period were identified from a prospectively maintained database. Patients undergoing MRI before and after CRT were included. Staging data from imaging were compared with histopathology reports and clinical notes.

Results

Overall, 64 patients were identified. Comparison of pre-treatment MRI to pathological staging revealed 14/64 patients (22%) experienced disease progression while on

CRT and 10/64 (16%) experienced no change in stage. Thirty-nine patients (61%) had a threatened circumferential resection margin on pretreatment MRI. This remained threatened in 28 cases (44%) despite CRT.

Of the 64 patients, 45 (70%) experienced a degree of downstaging of T or N status. The complete pathological response rate was just 5%. MRI following CRT predicted pathological TNM (tumour, lymph nodes, metastasis) staging in only 14/64 patients (22%). Sensitivity and specificity of MRI following CRT in terms of T staging were 97% and 52% respectively. For N staging, they were 79% and 61%. MRI staging following CRT correlated poorly with pathological T or N staging (kappa 0.189 and 0.047 respectively).

Conclusions

A significant number of patients do not respond or progress while receiving neoadjuvant CRT. Furthermore, MRI following treatment does not accurately predict histopathological staging of the resected tumour. It is recommended that surgical planning is based on the pretreatment staging.

Failure of radiological sentinel lymph node mapping should be considered an indicator of significant axillary disease in invasive breast cancer

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Introduction

Technetium-99m (^{99m}Tc) radioisotope labelling is used in the pre and intraoperative identification of axillary sentinel lymph nodes (SLNs). In a minority of patients, this SLN mapping fails. We hypothesised that this failure results from aberrations in lymph node architecture and lymphatic disruption secondary to malignant disease progression. This would manifest as increased tumour burden in the axilla.

Methods

This retrospective observational cohort study included all patients undergoing SLN biopsy in the Aneurin Bevan Health Board between April 2010 and April 2012, identified from a prospectively maintained database. Radiological 'no shows' were defined as patients who had no visible uptake

of ^{99m}Tc in the axilla prior to surgery. Pertinent pre, intra and postoperative data were collected. Statistical analysis was performed using Fisher's exact test and Student's t-test as appropriate.

Results

A total of 370 patients with 380 unilateral breast procedures were identified. Patients with radiological 'no shows' ($n=11$) required removal of more lymph nodes at the index procedure than those with 'standard' SLN biopsies (4.91 vs 2.50, $p<0.001$), with significantly more nodes being positive for malignant spread (2.73 vs 0.55, $p<0.001$). The majority (81%) of the 'no show' cohort required a subsequent axillary node clearance (vs 28% for standard SLN cohort). There was a non-significant trend towards more advanced disease (stages II and III) in the 'no show' cohort (100% vs 79%, $p=0.09$).

Conclusions

In modern breast units, failure of SLN mapping in patients with invasive breast cancers should not be seen as a pure technical failure but rather as a predictor of an increased tumour burden in the axilla. Such patients should be considered for more aggressive initial surgical management of their axilla. These patients are the perfect candidates for intraoperative polymerase chain reaction assessment of their nodal status.

Management of traumatic splenic injury

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Introduction

The recognition of overwhelming postsplenectomy infection and greater risk of malignancy in splenectomised patients has led to greater efforts to conserve splenic tissue in patients sustaining blunt torso trauma. Non-operative management of splenic trauma has emerged as a means to enhance splenic salvage. Accurate assessment of the severity of injury is required to ensure the safety of such an approach. Identification of splenic injuries that require early operation and repair or removal is vital. The aim of this study was to examine the management of trauma to the spleen in our institution and compare it against published guidelines in relation to assessment, indications for splenectomy and role of non-operative management in the absence of associated injuries.

Methods

A retrospective database was constructed to include splenic injuries admitted over a ten-year period. Cases were captured by searching the electronic computed tomography (CT) reports database for those containing the words

'splenic injury/rupture/laceration', and operations coded as 'splenectomy' were obtained and cross-checked against splenic pathology specimens. Cases not associated with traumatic injury were excluded. A range of parameters were assessed and compared against published guidance from both the Society for Surgery of the Alimentary Tract and the American Association for the Surgery of Trauma.

Results

A total of 48 cases of splenic injury were identified and road traffic accidents were the most frequent mechanism of injury. Thirty-eight underwent splenectomy while ten were managed conservatively. CT assessment was performed in all cases except four (who were taken straight for a resuscitative laparotomy). CT grading of the severity of splenic injury was reported in 8.3% of cases. Repeat imaging was sought in 60% of those cases initially managed conservatively, with 7.8% having a subsequent splenectomy. The average duration of observation was 0.8 days (range: 0–8 days) for patients undergoing a splenectomy and 10.1 days (range: 3–23 days) for those with successful conservative management. There was a single mortality in this cohort due to an associated head injury.

Conclusions

CT grading of splenic injury is underreported and the splenectomy rate is overrepresented in this cohort. Protocol-based management and formal CT grading of all splenic injuries is recommended, and will identify those who may benefit from a safe conservative approach.

Management of paediatric blunt abdominal trauma in South Wales, 2002–2012

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Introduction

In paediatrics, the majority of the blunt abdominal trauma (BAT) cases are effectively managed with a conservative non-operative approach, which includes a period of prolonged inpatient bed rest. However, based on a review published in 2000, many centres have employed a less stringent approach without adverse outcomes. We reviewed our data of BAT to verify the relevance of our current practice to this 'new' approach.

Methods

All admissions to our hospital for BAT between July 2002 and July 2012 were collated from ward diaries. Information collected included age, sex, mode of injury, organs involved, other injuries, treatment received, radiological findings and final outcome. The study focused on the duration of bed rest and the eventual outcome of these patients.

Table 1 Summary of patients managed non-operatively

	<i>n</i>	APSA inpatient stay guidelines	Our mean inpatient stay	Imaging guidelines	Imaging following our practice
Grade I–III	46	Max 4 days	9.2 days	Not required	41 (89%)
Grade IV–V	12	5 days	11.9 days	Not required	12 (100%)

Results

Adequate data were available for 202 patients admitted with BAT; 162 had imaging and 70 were found to have solid organ damage. There were 32 splenic, 32 renal and 16 hepatic injuries, with 17 patients presenting with multiple organ injury. Fifty-six patients were male and fourteen were female. The age ranged from 2 to 15 years (mean: 10 years). Fifty-eight patients (83%) were successfully managed non-operatively (Table 1). Overall, 12 patients required surgical intervention: 7 (58%) for acute instability within 48 hours and 5 (42%) after 72 hours for late organ obstruction or leak. Sixteen of the seventy patients with solid organ damage received a blood transfusion. This was required for acute haemodynamic instability within 72 hours in 14 patients (88%). Three-quarters (75%) of those requiring transfusion had grade IV/V injuries.

APSA = American Pediatric Surgical Association

Conclusions

Our data show that grade I–III injuries are associated with minimal morbidity. Our current inpatient stays are longer and radiological follow-up is more intense than recent standards accepted by the American Pediatric Surgical Association. There is therefore scope to modify future management of BAT cases. However, as five patients (7%) had late complications, leading to surgical intervention, it is important that paediatric BAT should be managed in the regional specialist surgical centres.

Trends in parathyroidectomy in England and Wales over the last decade: a review of uptake and demography using a linear regression model

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Introduction

Consensus guidelines on the management of asymptomatic primary hyperparathyroidism have recommended an increasingly liberal approach to parathyroidectomy. Furthermore, with the advent of minimally invasive techniques, authors from North America and the UK have also recommended intervention in the very elderly. This study examines whether these attitudes have translated into increased numbers of parathyroid operations over the last decade.

Methods

An review was carried out of Patient Episode Data for Wales and English Hospital Episode Statistics annual data from 2000 to 2010 for admissions per 100,000 population for parathyroidectomy (Office of Population Censuses and Surveys codes B14.1–B14.9). Statistical analysis was performed using linear regression.

Results

Between 2000 and 2010 there were 24,247 parathyroid operations in England and Wales (0.005% of the population), with 3 times as many women treated as men. Overall, incidence of parathyroidectomy rose from 3.2 per 100,000 population in 2000 to 5.7 per 100,000 population in 2010 ($p<0.0001$). In England, it rose from 3.3 per 100,000 population to 5.6 per 100,000 population and in Wales it rose from 2.4 per 100,000 population to 6.2 per 100,000 population. The difference in rate of change between England and Wales was significant ($p<0.05$) but the two cohorts did not exhibit any other significant demographic differences. Most notably, surgical intervention in those aged 60–74 years and ≥ 75 years nearly doubled over the decade ($p<0.001$).

Conclusions

The incidence of parathyroidectomy has increased dramatically in the last decade for all age groups. This likely reflects a lower threshold for referral among endocrinologists and physicians, and may be due to a combination of available guidelines and the realisation that surgical morbidity is now infrequent.

The effect of adjuvant preoperative therapy on patients with colorectal cancer awaiting surgical resection

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Introduction

The modern treatment of colorectal cancer consists of surgery, with or without adjuvant preoperative radiotherapy, chemotherapy or chemoradiotherapy (APT) for selected

cases. APT may be given prior to surgery in an attempt to facilitate surgical excision and improve survival. However, there is some evidence that APT in other cancers may affect the patient's health adversely and can increase the risk of operative morbidity. This study examined the affect of APT on the cardiopulmonary status, body composition, cytokine assay, nutritional status and quality of life in patients with colorectal cancer.

Methods

Cardiopulmonary function was measured with cardiopulmonary exercise testing to achieve the anaerobic threshold and maximum oxygen consumption (VO_2 max). Anthropometric parameters (midarm circumference, triceps skin fold, grip strength, body weight, height and body mass index) and body fluid composition (extracellular and intracellular water, total body water, fat free mass) were measured using a bioimpedance analyser. C-reactive protein levels and nine cytokines were measured using a Lumindex[®] assay. Nutritional status and quality of life were assessed using two validated questionnaires (the European Organisation for Research and Treatment of Cancer's QLQ-C30 and the Patient-Generated Subjective Global Assessment). These assessments were made before and after the administration of APT. The Mann-Whitney U test was used to compare the results.

Results

A total of 36 patients (28 men, 8 women) with colorectal cancer (32 rectal cancers) were recruited. The mean patient age was 63.7 years (range: 41–80 years). There was a significant decline in VO_2 max ($p=0.028$), an increase in the ventilatory equivalent ratio for CO_2 (VE/VCO_2) ($p=0.006$), a decrease in the extracellular water ($p=0.014$) and midarm circumference ($p=0.006$) as well as a reduction in triceps skin fold ($p=0.011$) following exposure to APT. There was an overall reduction in the quality of life after APT.

Conclusions

Our data suggest that APT has a significant effect on the cardiopulmonary capacity with reduced VO_2 max and anaerobic threshold as well as an increased VE/VO_2 and VE/VCO_2 . There were also signs of fluid depletion with a significant reduction in the extracellular and intracellular water. Fat free mass, midarm circumference and triceps skin fold were also reduced, indicating a loss in the lean body mass. These changes may increase the risk of peri and postoperative morbidity. In view of this, a period of optimisation following APT and prior to surgery may serve to minimise the risk of such complications.