Right iliac fossa mass: A prospective study

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Abstract
Patients presenting with mass in the right iliac fossa is common for a surgeon. The causes differ based on the organ of origin. The common conditions include appendicular mass, appendicular abscess, ileocecal tuberculosis and ascending colon carcinoma. Rare conditions include Non-Hodgkin’s lymphoma, cecal carcinoma, amoeboma, lymph node mass, iliopsoas mass, retroperitoneal mass and Crohn’s disease. This makes it difficult to diagnose and manage these patients. Hence a prospective study on right iliac fossa masses was conducted. Out of a total of 50 patients, the most common cause was of appendicular origin, mainly appendicular mass followed by ileocecal tuberculosis. Pain, fever and leucocytosis were predominantly noted in inflammatory conditions whereas weight loss, anaemia and painless mass were noted in neoplastic causes. Appendicular mass patients were treated conservatively followed by interval appendectomy. Appendicular abscess was drained extra-peritoneally. Right hemicolectomy was done for carcinoma in the cecum and ascending colon. Tubercular patients with intestinal obstruction also underwent right hemicolectomy. Intra-venous antibiotics were administered to all infective cases. Tubercular masses were started on anti-tubercular drugs. Carcinoma patients received adjuvant therapy. Crohn’s disease and non-specific lymphadenitis were treated medically. Hence our study shows that managing right iliac fossa mass patients can be challenging and requires vigilance.

Keywords: Right iliac fossa mass; appendicular, ileocecal TB

1. Introduction
Mass in the right iliac fossa (RIF) is a common clinical condition that a surgeon faces in one’s day to day practice. Various structures from which RIF masses can arise include the terminal ileum, appendix, cecum, ascending colon, iliopsoas region, mesenteric lymph nodes and the retroperitoneal structures [1,2]. They can be inflammatory, infective, neoplastic, etc. Hence it a diagnostic challenge to the treating surgeon. The common conditions include appendicular mass, appendicular abscess, ileocecal tuberculosis [3] and ascending colon carcinoma. Rare conditions include Non-Hodgkin’s lymphoma, cecal carcinoma [4], amoeboma, lymph node mass, iliopsoas mass, retroperitoneal mass and Crohn’s disease [1,5]. Urologic and gynaecologic masses can also present in RIF.

Most of the above mentioned conditions present with pain in the abdomen, more in the right lower quadrant. It might be associated with fever, nausea, vomiting, constipation, diarrhoea, weight loss etc. Obesity and tenderness make clinical examination difficult leading to diagnostic difficulties. Also those who present with atypical manifestations [6] and associated comorbidities like diabetes mellitus, hypertension, cardiac illness, etc make the management tougher.

Hence this prospective clinical study was conducted at our institute to evaluate the clinical presentation and management of patients with RIF mass.

2. Materials and methods
A prospective study was conducted in Victoria Hospital, affiliated to Bangalore Medical College and Research Institute, Bangalore, India. The study was approved by the Institutional Ethical Review Board. Written informed consent was obtained from each study subject at the time of enrolment.

A total of 50 patients who presented with RIF mass were included. Patients below 18 years of age were excluded. Patients who were eventually diagnosed to have RIF mass of urologic or gynaecologic origin and those with extra-abdominal pathology were excluded.

After taking detailed history and clinical examination; relevant blood, radiological investigations [7,8] and colonoscopy (if needed) were done to arrive at the final
diagnosis. The patients were managed appropriately based on the diagnosis and surgical indications.

Data was collected, compiled, tabulated and analysed using Microsoft Excel.

3. Results

This was a prospective study comprising of 50 patients who presented with mass in the right iliac fossa of the abdomen.

Table 1: Incidence of disease

| Diagnosis               | Frequency | Percentage |
|-------------------------|-----------|------------|
| Appendicular abscess    | 4         | 8          |
| Non-Hodgkin lymphoma    | 1         | 2          |
| Ascending colon carcinoma| 1        | 2          |
| Cecal carcinoma         | 1         | 2          |
| Intussusception         | 1         | 2          |
| Non-specific lymphadenitis| 1       | 2          |
| Crohn’s disease         | 1         | 2          |
| **Total**               | **50**    | **100**    |

Out of 50 patients, 30 had appendicular mass which was the most common diagnosis. 10 had ileocecal TB and 4 had appendicular abscess, 1 patient each had Non-Hodgkin’s lymphoma, ascending colon carcinoma, cecal carcinoma, intussusception, Crohn’s disease and non-specific lymphadenitis.

Table 2: Age distribution (years)

| Diagnosis           | <20 | 21-30 | 31-40 | 41-50 | >50 |
|---------------------|-----|-------|-------|-------|-----|
| Appendicular mass   | 4   | 22    | 3     | 1     | 0   |
| Ileocecal TB        | 0   | 1     | 7     | 2     | 0   |
| Appendicular abscess| 1   | 2     | 1     | 0     | 0   |
| Non-Hodgkin lymphoma| 0   | 0     | 1     | 0     | 0   |
| Ascending colon carcinoma| 0 | 0 | 0 | 1 | 0 |
| Cecal carcinoma     | 0   | 0     | 0     | 0     | 1   |
| Intussusception     | 0   | 0     | 1     | 0     | 0   |
| Non-specific lymphadenitis| 1 | 0 | 0 | 0 | 0 |
| Crohn’s disease     | 0   | 0     | 0     | 1     | 0   |
| **Total**           | **6** | **25** | **13** | **5** | **1** |

Mean age was 30.94 years. Most of the patients belonged to 21-30 years’ age group followed by 31-40 years.

Table 3: Sex distribution

| Diagnosis           | Male | Female | Total |
|---------------------|------|--------|-------|
| Appendicular mass   | 18   | 12     | 30    |
| Ileocecal TB        | 6    | 4      | 10    |
| Appendicular abscess| 2    | 2      | 4     |
| Non-Hodgkin lymphoma| 0    | 1      | 1     |
| Ascending colon carcinoma| 1 | 0 | 1 |
| Cecal carcinoma     | 1    | 0      | 1     |
| Intussusception     | 1    | 0      | 1     |
| Non-specific lymphadenitis| 0 | 1 | 1 |
| Crohn’s disease     | 1    | 0      | 1     |
| **Total**           | **30** | **20** | **50** |

Out of 50 patients, 30 were male and 20 were female. Appendicular cause was common in male patients. Non-specific lymphadenitis was noted in a female.

Table 4: Symptoms on presentation

| Diagnosis           | Pain abdomen | Nausea / vomiting | Fever | Constipation | Diarrhoea | Weight loss |
|---------------------|--------------|-------------------|-------|--------------|-----------|-------------|
| Appendicular mass   | 30           | 20                | 30    | 0            | 0         | 0           |
| Ileocecal TB        | 10           | 0                 | 10    | 2            | 2         | 0           |
| Appendicular abscess| 4            | 4                 | 4     | 0            | 1         | 0           |
| Non-Hodgkin lymphoma| 1            | 0                 | 1     | 0            | 0         | 0           |
| Ascending colon carcinoma| 1 | 0 | 0 | 0 | 0 |
| Cecal carcinoma     | 0            | 0                 | 0     | 0            | 0         | 1           |
| Intussusception     | 1            | 1                 | 1     | 0            | 0         | 0           |
| Non-specific lymphadenitis| 1 | 0 | 1 | 0 | 0 |
| Crohn’s disease     | 1            | 0                 | 0     | 1            | 1         | 0           |

Pain in the right lower abdomen was the most common symptom in inflammatory causes followed by fever. Dull aching pain with weight loss was noted in neoplastic causes.

Table 5: Characteristics of mass

| Diagnosis           | No. of cases | Tenderness | Consistency | Borders           | Mobility |
|---------------------|--------------|------------|-------------|-------------------|---------|
| Appendicular mass   | 30           | 30         | Firm        | Well defined except lower border | Restricted |
| Ileocecal TB        | 10           | 4          | Firm        | Ill defined       | Restricted |
| Appendicular abscess| 4            | 4          | Firm        | Well defined except lower border | Restricted |
| Non-Hodgkin lymphoma| 1            | 1          | Firm        | Ill defined       | Mobile   |
| Ascending colon carcinoma| 1 | 0 | Hard | Well defined | Fixed |
| Cecal carcinoma     | 1            | 0          | Hard        | Well defined      | Mobile   |
| Intussusception     | 1            | 1          | Soft        | Ill defined       | Mobile   |
| Non-specific lymphadenitis| 1 | 1 | Firm | Well defined | Mobile |
| Crohn’s disease     | 1            | 1          | Firm        | Ill defined       | Restricted |
| **Total**           | **50**       | **42**     | -           | -                 | -       |
Inflammatory masses were tender and firm in consistency. Tubercular mass was predominantly non-tender and firm. Neoplastic masses were hard, non-tender and fixed.

Table 6: Haemoglobin <10g/dl

| Diagnosis               | No. of cases | Haemoglobin<10g/dl |
|------------------------|--------------|--------------------|
| Appendicular mass      | 30           | 11                 |
| Ileocecal TB           | 10           | 7                  |
| Appendicular abscess   | 4            | 1                  |
| Non-Hodgkin lymphoma   | 1            | 1                  |
| Ascending colon carcinoma | 1       | 1                  |
| Cecal carcinoma        | 1            | 1                  |
| Intussusception        | 1            | 0                  |
| Non-specific lymphadenitis | 1        | 0                  |
| Crohn’s disease        | 1            | 1                  |
| **Total**              | **50**       | **23**             |

Neoplastic and tubercular masses were associated with anaemia.

Table 6: ESR

| Diagnosis               | No. of cases | ESR <20 | ESR 21-40 | ESR >40 |
|------------------------|--------------|---------|-----------|---------|
| Appendicular mass      | 30           | 22      | 8         | 0       |
| Ileocecal TB           | 10           | 0       | 1         | 9       |
| Appendicular abscess   | 4            | 2       | 2         | 0       |
| Non-Hodgkin lymphoma   | 1            | 0       | 0         | 1       |
| Ascending colon carcinoma | 1       | 0       | 0         | 1       |
| Cecal carcinoma        | 1            | 0       | 0         | 1       |
| Intussusception        | 1            | 1       | 0         | 0       |
| Non-specific lymphadenitis | 1        | 0       | 1         | 0       |
| Crohn’s disease        | 1            | 0       | 0         | 1       |
| **Total**              | **50**       | **25**  | **12**    | **13**  |

Neoplastic and tubercular masses were associated with elevated ESR.

Table 7: Leukocyte count

| Diagnosis               | No. of cases | Elevated leukocyte count |
|------------------------|--------------|--------------------------|
| Appendicular mass      | 30           | 30                       |
| Ileocecal TB           | 10           | 7                        |
| Appendicular abscess   | 4            | 4                        |
| Non-Hodgkin lymphoma   | 1            | 1                        |
| Ascending colon carcinoma | 1       | 0                        |
| Cecal carcinoma        | 1            | 0                        |
| Intussusception        | 1            | 0                        |
| Non-specific lymphadenitis | 1        | 1                        |
| Crohn’s disease        | 1            | 1                        |
| **Total**              | **50**       | **44**                   |

Inflammatory causes were associated with elevated leukocyte count. [9-11]

Table 7: Treatment modality

| Diagnosis               | No. of cases | Conservative | Surgical |
|------------------------|--------------|--------------|----------|
| Appendicular mass      | 30           | 30           | 0        |
| Ileocecal TB           | 10           | 8            | 2        |
| Appendicular abscess   | 4            | 0            | 4        |
| Non-Hodgkin lymphoma   | 1            | 1            | 0        |
| Ascending colon carcinoma | 1       | 0            | 1        |
| Cecal carcinoma        | 1            | 0            | 1        |
| Intussusception        | 1            | 0            | 1        |
| Non-specific lymphadenitis | 1        | 1            | 0        |
| Crohn’s disease        | 1            | 1            | 0        |
| **Total**              | **50**       | **41**       | **9**    |

Appendicular mass patients were treated conservatively followed by interval appendectomy. Appendicular abscess was drained. Tubercular mass presenting with intestinal obstruction underwent surgery. Carcinoma patients underwent surgery followed by adjuvant therapy.
**Table 8: Types of surgery**

| Diagnosis                          | Ochsner-Sherren regimen with interval appendectomy | Extra-peritoneal drainage with interval appendectomy | Right hemicolectomy |
|------------------------------------|---------------------------------------------------|-----------------------------------------------------|----------------------|
| Appendicular mass                  | 30                                                | 0                                                   | 0                    |
| Ileocecal TB                       | 0                                                 | 0                                                   | 2                    |
| Appendicular abscess               | 0                                                 | 4                                                   | 0                    |
| Non-Hodgkin lymphoma               | 0                                                 | 0                                                   | 0                    |
| Ascending colon carcinoma          | 0                                                 | 0                                                   | 1                    |
| Cecal carcinoma                    | 0                                                 | 0                                                   | 1                    |
| Intussusception                    | 0                                                 | 0                                                   | 1                    |
| Non-specific lymphadenitis         | 0                                                 | 0                                                   | 0                    |
| Crohn’s disease                    | 0                                                 | 0                                                   | 0                    |
| **Total**                          | **30**                                            | **4**                                               | **5**                |

Appendicular mass patients underwent interval appendectomy. Appendicular abscess patients were subjected to extra-peritoneal drainage of abscess with interval appendectomy. Right hemicolectomy was done for carcinoma in the cecum and ascending colon. Tubercular patients with intestinal obstruction also underwent right hemo-colectomy.

**Table 9: Complications**

| Diagnosis             | No. of cases | Wound infections | ARDS | Sepsis |
|-----------------------|--------------|------------------|------|--------|
| Appendicular mass     | 30           | 3                | 0    | 0      |
| Ileocecal TB          | 10           | 0                | 0    | 0      |
| Appendicular abscess  | 4            | 2                | 1    | 1      |
| Non-Hodgkin lymphoma  | 1            | 0                | 0    | 0      |
| Ascending colon carcinoma | 1      | 0                | 0    | 0      |
| Cecal carcinoma       | 1            | 0                | 0    | 0      |
| Intussusception       | 1            | 0                | 0    | 0      |
| Non-specific lymphadenitis | 1      | 0                | 0    | 0      |
| Crohn’s disease       | 1            | 0                | 0    | 0      |
| **Total**             | **50**       | **5**            | **1**| **1**  |

Wound infection after surgery was the most common complication. ARDS and sepsis were present in 1 appendicular abscess patient.

**Table 10: Adjuvant therapy**

| Diagnosis             | No. of cases | IV antibiotics | ATT | Chemotherapy | Sulfasalazine & steroid enema |
|-----------------------|--------------|----------------|-----|--------------|-------------------------------|
| Appendicular mass     | 30           | 30             | 0   | 0            | 0                             |
| Ileocecal TB          | 10           | 0              | 10  | 0            | 0                             |
| Appendicular abscess  | 4            | 4              | 0   | 0            | 0                             |
| Non-Hodgkin lymphoma  | 1            | 0              | 0   | 1            | 0                             |
| Ascending colon carcinoma | 1        | 0              | 0   | 1            | 0                             |
| Cecal carcinoma       | 1            | 0              | 0   | 1            | 0                             |
| Intussusception       | 1            | 1              | 0   | 0            | 0                             |
| Non-specific lymphadenitis | 1       | 1              | 0   | 0            | 0                             |
| Crohn’s disease       | 1            | 1              | 0   | 0            | 1                             |
| **Total**             | **50**       | **37**         | **10** | **3** | **1**                       |

Intra-venous antibiotics were administered to all infective cases. Tubercular masses were started on anti-tubercular drugs based on the category. Carcinoma patients received adjuvant chemotherapy. Crohn’s disease was treated medically using Sulfasalazine and steroid enemas.

**4. Discussion**

This study aimed to evaluate the clinical features and management of RIF masses presenting to a General Surgeon. Based on our findings it can be concluded that appendicular mass is the commonest, followed by ileocecal tuberculosis. Most of the patients belonged to the age group of 21-40 years. Appendicular causes were managed conservatively or by abscess drainage followed by surgery. Ileocecal tuberculosis was diagnosed based on blood and radiological investigations along with colonoscopy. Those with obstruction underwent surgery and all were started on anti-tubercular treatment. [12-17]. Carcinoma patients underwent right hemicolecctiony followed by adjuvant therapy. NHL patient was treated with chemotherapy. Intussusception patient underwent resection and anastomosis. Non-specific lymphadenitis and Crohn’s disease were managed conservatively.
5. Conclusion

Hence the surgeon must keep in mind that even though mass of appendicular origin and tuberculosis are common in the RIF, precaution must be taken to not miss the rarer causes, in order to diagnose and treat them at the earliest.

Conflict of interest

We have no conflict of interest to declare.

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