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ORIGINAL ARTICLE

Revisiting the role of MRI in gynecological emergencies – An institutional experience

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Abstract *Objective:* Gynecological emergencies continue to be a diagnostic challenge. Although ultrasound is an excellent first line imaging modality, there are many instances where sonographic findings are indeterminate. The purpose of this study was to assess the emerging role of MRI in gynecological emergencies.

Methods: 88 patients with acute pelvic pain or bleeding per vagina who underwent MRI at our imaging department between October 2012 and September 2014 were reviewed. The final diagnosis was established by surgical findings in 69 cases, endovascular intervention & biopsy in 1 respectively. The remaining 17 cases underwent follow-up MRI.

Results: MRI was diagnostic in 84 (95.5%) out of 88 patients and non-diagnostic in 4 cases. The commonest gynecological emergency was pelvic inflammatory disease. Imaging findings in 71 (80.7%) patients were correlated with surgery or biopsy. The overall sensitivity and PPV of MRI in acute gynecological pathologies was 96.6% and 98.8%.

Conclusion: Women presenting to the emergency room with acute pelvic pathology require prompt diagnosis to ensure timely management. MRI is superior to ultrasound in pelvic lesion characterization and is the problem solving modality when initial ultrasound is inconclusive. Our study demonstrated that MRI can play a significant role in providing accurate diagnosis in gynecological emergencies.

1. Introduction

Patients presenting to hospitals with gynecological emergencies is common & clinically challenging as there are a wide range of differentials for uterine/adnexal mass lesions (1). A detailed clinical and accurate menstrual history helps narrows the differentials. Majority of the patients present with abdomino-pelvic pain and/or vaginal bleeding. Every female in the reproductive age group, presenting with pelvic pain or

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vaginal bleeding, should be considered a case of ectopic pregnancy until proven otherwise. Gynecological emergencies can be medical or surgical. While Ultrasound (US) is, without a doubt, the best initial imaging tool, it is highly operator dependent and requires patient co-operation (1). Many times, even at the hands of a skilled operator, US findings are non-diagnostic and further imaging is required. Magnetic Resonance Imaging (MRI) is emerging as a reliable, superior tool in imaging adnexal masses (2–5). Radiologists need to be familiar with the clinical modes of presentation and spectrum of MR imaging findings when initial US is inconclusive. We looked into the gynecological emergencies that required MR evaluation at our institute during a 2 year period, to assess the role of pelvic MR imaging in an emergent setting.

2. Methods

Our surveillance period spanned 2 years, from October 2012 to September 2014. All female patients presenting our hospital (Al Sabah hospital, Kuwait) with acute gynecological complaints who underwent MRI of the pelvis were included. Either of the two MRI machines (GE 1.5T optima & 3.0T Signa) at our institute was used. All these patients had undergone sonographic assessment of the pelvis prior to the MRI. The ultrasound examinations were carried out by the on-call radiology residents. The reasons for proceeding to MRI after initial ultrasound varied from inconclusive or partially conclusive US findings, to requiring a better, more complete assessment of the pelvis prior to surgical management. The following variables were analyzed: presenting complaints, MR imaging findings and mode of management (conservative or surgical). In cases of surgical or interventional management, correlation with preoperative MR imaging diagnosis was done. Follow-up data of the surgically & non-surgically managed patients were also collected. The efficacy of MRI was assessed based on its sensitivity and positive predictive value. All statistical analyses were conducted using Microsoft Excel 2003 and Predictive Analytics SoftWare (PASW) Statistics v. 18.0. The Human Ethics Committee at Al-Sabah Hospital, Ministry of Health – Kuwait approved the study.

3. Results

In the two year period, October 2012 to September 2014, a total of 88 women with acute gynecological emergencies underwent MRI at our institute (Table 1). MRI failed to correctly diagnose 4 cases – 1 case of pelvic inflammatory disease (PID), 1 parovarian cyst, 1 adenomyosis & 1 torsed ovary. For acute gynecological pathologies, MRI had an overall sensitivity of 96.6% and PPV of 98.8%.

71 out of 88 patients (80.7%) underwent surgery (69 cases), endovascular intervention (1 case) and biopsy (1 case). The surgical (laparoscopy/laparotomy) indications ranged from oophorectomy (in torsed ovarian masses, complicated ovarian cysts, chocolate cysts), surgical detorsion of the ovary in one teen patient, hysterectomy in adenomyosis, subserous fibroids and release of adhesions secondary to endometriosis. 17 cases were managed conservatively and also underwent follow-up MRI; their imaging findings were consistent with the initial diagnosis by MRI.

The female patients presenting to the emergency room ranged from pediatric age group to adolescents, women in reproductive age group and postmenopausal women (mean age: 34 years; age range: 3–57 years) (Table 2). The different presenting complaints included abdominal/pelvic pain, bleeding per vagina, fever, acute retention of urine and acute intestinal obstruction (Table 3). The commonest presenting complaint was abdominal/pelvic pain. The duration of complaints lasted from few hours to few days.

The commonest gynecological pathology in our study was PID, accounting for a total of 17 cases. All were complications of PID, 8 patients had large tubo-ovarian complex masses, 4 tubo-ovarian abscesses (Fig. 1a), 2 hydrosalpinx, 1 pyosalpinx (Fig. 1b and c) and 2 pelvic peritonitis. 1 patient in whom MRI was non-diagnostic had acute PID; it was a case of fitz-hugh-curtis syndrome (perihepatitis, pericholecystic inflammation and PID). 12 patients underwent laparoscopic management, rest were managed medically. In the diagnosis of PID, MRI had a sensitivity of 95.7% and PPV of 100%,

There were 13 cases of endometriosis in this study. MRI was diagnostic in all cases. The youngest patient presenting acutely with endometriosis was 17 years old. Out of the 13 cases, 11 had deep pelvic endometriosis; additionally, chocolate cysts were also present in 4 patients. The rest of the endometrial deposits were present in the cul-de-sac, bowel serosal surface, uterine surface, utero-sacral ligaments & pelvic peritoneum. 1 patient presented with a large pre-sacral endometriotic cyst which had displaced, compressed the rectum & caused intestinal obstruction secondary to mass effect (Fig. 2). 2 patients with history of prior pelvic surgery had scar endometriosis, both in the anterior abdominal wall (Fig. 3). 10 of the 13 patients underwent surgery, rest were managed conservatively. In the diagnosis of endometriosis, MRI had a sensitivity of 100% and PPV of 100%.

16 cases of adnexal cysts were present, 11 ovarian cysts, 2 parovarian cysts & 3 peritoneal inclusion cysts. Of the 11 ovarian cysts, 8 were large hemorrhagic follicular/corpus luteal cysts and 3 were ruptured ovarian cysts (Fig. 4). We had 2 parovarian cysts, only one of which was diagnosed by MRI. The second parovarian cyst had ruptured & was actively bleeding, MRI was inconclusive. It was diagnosed by laparotomy. 11 of 16 patients underwent laparotomy. In the detection of adnexal cysts, MRI had a sensitivity of 94.1% and PPV of 100%.

There were 8 cases of adenomyosis, 6 cases with diffuse adenomyosis (Fig. 5), remaining 2, segmental adenomyosis. 1 case of focal adenomyosis could not be diagnosed by MRI; it was diagnosed following hysterectomy. 6 of the 8 patients with adenomyosis underwent hysterectomy. All 6 patients were above 45 years & had completed their family life, hence underwent operative management. In the diagnosis of adenomyosis, MRI had a sensitivity of 88.9%, PPV of 100%.

10 cases of ovarian torsion were present in this study. An underlying pathology was detectable in 7 of the 10 cases; all were large mature & immature teratomas. In addition to torsion, two teratomas had also ruptured. In 2 cases of torsion, no underlying pathology was detectable within the ovary (Fig. 6). 1 case spontaneously detorted (proven by repeat MRI). 1 case of torsion was not diagnosed by MRI. 9 were managed surgically. In the diagnosis of torsion, MRI had a sensitivity of 90% and PPV of 100%.