

Radiology in Focus

The role of ultrasound in the management of peritonsillar abscess

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Abstract

A distinction between a peritonsillar abscess and peritonsillitis is useful clinically, as the former requires surgical drainage while the latter merely requires treatment with antibiotics. To evaluate the diagnostic implications of performing ultrasonography of the tonsils in patients with clinically diagnosed peritonsillar abscess, 27 patients underwent ultrasound examination before needle aspiration of the abscess was performed. Ultrasound was able to detect peritonsillar abscess in 91 per cent of the cases (sensitivity rate), with a false negative rate of nine per cent and a false positive rate of 20 per cent. The specificity of the test was 80 per cent, and was able to differentiate abscess from peritonsillitis in 88.9 per cent. On the basis of these results we conclude that ultrasonography of the tonsils in patients thought to have peritonsillar abscess is a useful adjunct, enhancing diagnostic accuracy and reducing unnecessary surgical drainage.

Key words: Peritonsillar abscess; Ultrasonography

Introduction

A peritonsillar abscess or quinsy is one of the most common head and neck abscesses encountered in clinical practice. Controversy still exists as to what is the optimal treatment of this condition. Some have advocated immediate tonsillectomy (Bonding, 1976; Templar *et al.*, 1977; Chowdhury and Bricknell, 1992) but this is not widely practised in the UK. In most instances, the management of peritonsillar abscess often requires an invasive procedure like aspiration (Herzon, 1984; Ophir *et al.*, 1988; Stringer *et al.*, 1988; Maharaj *et al.*, 1991) or incision drainage (Cachin, 1979) of the pus together with appropriate antibiotic therapy.

Peritonsillar abscess and peritonsillitis without abscess formation may be difficult to distinguish clinically, as both may have similar presenting features. Distinction between these two conditions is important, at least on therapeutic grounds, as treatment for peritonsillar abscess is surgical drainage, while peritonsillitis only requires antibiotic therapy. Also, surgical drainage in peritonsillar abscess is not always successful especially if the drainage is performed during the phlegmonous peritonsillitis stage or at an inappropriate site.

Ultrasonography is commonly used in the detection and localization of abscess in the liver, pancreas and kidney. Its use, however, in the detection of peritonsillar abscess is only recent (Mosges *et al.*, 1990; Boesen and Jensen, 1992; Haeggstrom *et al.*, 1993).

The aim of this initial study was to determine the role of ultrasound scan in the management of quinsy. Its principle aim was to evaluate its role as a diagnostic tool in detecting any abscess for-

mation and thus distinguishing the abscess from early peritonsillitis.

Materials and methods

Twenty-seven adult patients with a clinical diagnosis of quinsy were included in the study carried out between May and December 1992, after approval was obtained from the South Sefton Ethical Committee. There were 19 males and eight females with an average age of 28 years (range: 21–52 years).

All these patients were admitted for an intravenous antibiotic, with or without intravenous fluid, depending on the severity of their dysphagia.

After obtaining informed consent, ultrasound scans of both tonsils were carried out. Scans were performed within two hours of their admission (range 25 minutes to 4 hours 30 minutes). Two patients admitted late in the night were excluded from the study as this would have involved a delay in instituting their surgical management. The scan was performed by two of the authors (K.S. and A.S.) without any knowledge of the suspected side of the peritonsillar abscess. The curvilinear transducer (7.5 MHz, sector scanner) of the ultrasound scanner (Aloka Echo Camera SSD-650) was placed externally on the neck medial to the angle of the mandible and directed postero-superiorly towards the tonsillar fossa. The entire tonsillar region was scanned and the state of the tonsils together with any abscess cavity was noted.

All patients, once returned to the ward, had their 'quinsy' drained, using needle aspiration, by another author (K.A.) without any knowledge of the results of the scan. Needle aspiration was performed using a 10 ml syringe with an 18 FG needle after



FIG. 1

Ultrasonogram of a normal tonsil, showing an oval area of uniform low echo reflection.

application of topical two per cent xylocaine spray. Aspiration was performed at three sites, starting at the superior pole, usually at the point of maximal bulging, and progressing inferiorly, the second point being the mid-tonsillar region and the third at the lower pole. Aspiration confirmed the presence or absence of pus. The procedure was well tolerated in all the patients.

The results of needle aspiration were compared with the results of the ultrasound scan.

Results

Ultrasonography allows a clear visualization of the tonsils and its related structures. A normal tonsil (Figure 1) shows up as a more or less triangular or oval structure of uniform low echo reflectivity, showing a slightly lower reflectivity compared to salivary or thyroid glands. In peritonsillitis, as shown in Figure 2, the tonsil may be normal in sizes but is usually enlarged with low non-uniform echo reflectivity. Figures 3 and 4 demonstrate an echo-poor area representing an abscess cavity in a quinsy. This may surround the tonsil and usually has a well-defined margin.

The results of the study are shown in Table I. Needle aspiration confirmed an abscess cavity in 81.5 per cent (22/27) patients, and peritonsillitis with negative aspiration in 18.5 per cent (5/27). Ultrasound scan revealed a peritonsillar abscess in 77.8 per cent (21/27) cases and peritonsillitis in six of the 27 (22.2 per cent) patients.

The overall accuracy of ultrasonography in differentiating

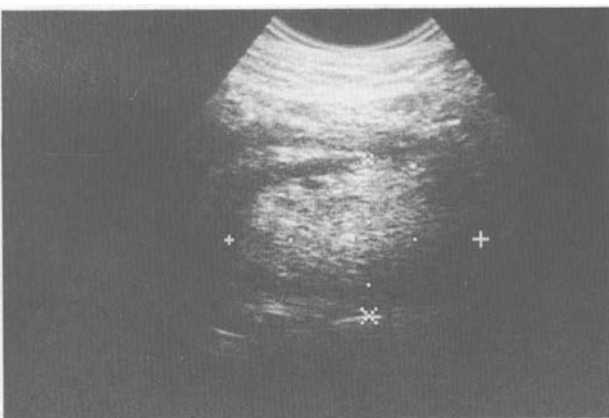


FIG. 2

The gland is enlarged in a patient with peritonsillitis, and contains low echogenicity areas.

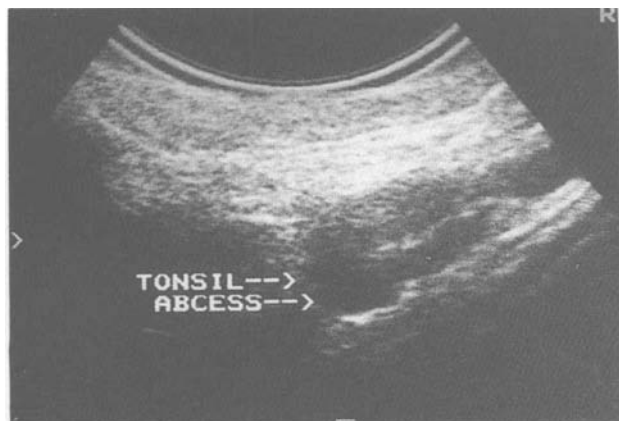


FIG. 3

An abscess cavity in a peritonsillar abscess is demonstrated as an echo-poor area.

peritonsillar abscess from peritonsillitis was 88.9 per cent (24/27). It effectively demonstrated peritonsillar abscess in 91 per cent (20/22) of the cases. In two patients, though, the scan showed no abscess cavity and these were diagnosed as peritonsillitis. Aspiration, however, revealed pus thus giving a false negative rate of nine per cent.

Ultrasonography could also detect peritonsillitis in 80 per cent (4/5) of the patients. However, one patient (20 per cent), who was diagnosed by the scan as having an abscess, did not reveal any pus on aspiration (false positive). He made a complete recovery.

Thus the sensitivity of ultrasound in patients with peritonsillar abscess was 91 per cent and specificity 80 per cent. The positive predictive value of ultrasound was 95 per cent and the negative predictive value 67 per cent. The Youden index was 71 per cent.

Discussion

Although ultrasonography is a well-established procedure with which to detect and localize abscess formation in the liver, pancreas and the perinephric region (Ross, 1980), its use in direction and diagnosis of peritonsillar abscess is only recent (Mosges *et al.*, 1990; Boesen and Jensen, 1992).

Clinical diagnosis of peritonsillar abscess can be difficult. About 30 per cent are located in the mid or lower pole and can be missed if puncture is performed at the upper pole, the traditional site for surgical drainage. Management of this condition requires

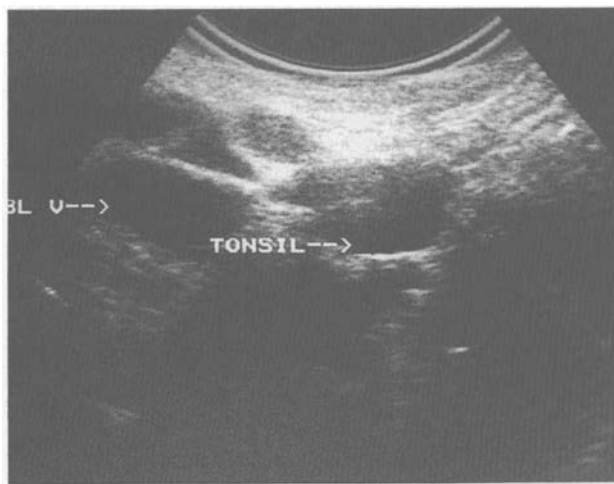


FIG. 4

Ultrasound shows low echogenicity and an anechoic area at superior pole posteriorly consistent with tonsillitis and abscess at the upper pole.

TABLE I
RESULTS OF ULTRASONOGRAPHY AND NEEDLE ASPIRATION IN
QUINSY

Needle aspiration (n = 27)	Ultrasound scan (n = 27)	
	Quinsy	Peritonsillitis
Quinsy (n = 22)	20	2
Peritonsillitis (n = 5)	1	4

n = Number of patients.

antibiotics, intravenous fluids, surgical drainage and abscess tonsillectomy in various combinations. Surgical treatment usually involves incision and drainage (Cachin, 1979), but needle aspiration, and especially three point aspiration has gained more acceptance in recent years (Herzon, 1984; Ophir *et al.*, 1988; Stringer *et al.*, 1988).

Ultrasonography can be a useful adjunct in the diagnosis of this common disease. Mosges *et al.* (1990) described their experiences with ultrasonography in detecting peritonsillar abscess. In a prospective study on 36 patients, ultrasonography was sensitive in detecting peritonsillar abscess in 82 per cent of the cases. Results of a recent study of patients with suspected peritonsillar abscess by Boesen and Jensen (1992), comparing the detection rate of peritonsillar abscess by ultrasonography with that of immediate tonsillectomy, showed it was possible to verify and diagnose a peritonsillar abscess correctly by ultrasound in 92 per cent of the cases. Haeggstrom *et al.* (1993), in a series of 12 patients, used intraoral ultrasonography to diagnose peritonsillar abscess with a high degree of accuracy. Our study confirms that peritonsillar abscess can be clearly demonstrated by external ultrasound scanning and our findings are almost identical, giving a sensitivity rate of 90.9 per cent.

The overall accuracy of ultrasonography in patients with peritonsillar abscess/peritonsillitis was 88.9 per cent. One patient (one out of five i.e. 20 per cent) had a false positive result (abscess shown by the scan but no pus on aspiration). It is possible that intense tissue oedema resulted in an echo-poor area thus resembling pus or that a small area of pus was missed on aspiration. Two patients (nine per cent) shown to have peritonsillitis but no abscess on the scan had positive aspiration of pus (false negative). One possible explanation could be that the ultrasound scan was unable to pick up a very small abscess. The false positive rate appears to be high, but as the numbers are small, this figure may be slightly exaggerated. As mentioned earlier, the sensitivity of ultrasonography in our series was 90.9 per cent, and the specificity of the test was 80 per cent.

Diagnosis of a peritonsillar abscess still presents a problem as it is difficult to distinguish clinically whether an abscess or oedema is present, and it usually requires one diagnostic aspiration puncture (Haeggstrom *et al.*, 1993). Our initial study shows that ultrasound scan appears to be a useful and simple noninvasive diagnostic tool in the management of quinsy. It can reliably distinguish the early stage of peritonsillitis from well-established abscess formation. Such distinction can avoid an unnecessary and painful drainage procedure, as peritonsillitis can be treated with antibiotics. Its use also becomes more apparent in diagnosis when inability to open the mouth due to trismus can preclude a conclusive clinical examination. Another advantage appears to be the ability of the scan to localize the site of abscess in relation to the tonsil, thus guiding the clinician toward the best site for drainage. This certainly seemed to be our experience although we did not pursue this any further. It is also possible that the scan may detect early formation of an abscess in the neck or the parapharyngeal space.

The procedure itself is quick and easy to perform, and as the transducer is placed externally, quite painless to the patient. Above all, there are no harmful side effects. A recent study (Patel

et al., 1992) using CT scan with contrast, enabled differentiation of quinsy from peritonsillitis in 100 per cent of cases. However, this causes unnecessary radiation exposure, and we feel ultrasonography, although not as accurate as a CT scan, is a better alternative as no radiation is involved, and the test can be repeated if necessary.

It would appear therefore that ultrasound can play a significant role in the rapid diagnosis and discharge of patients with quinsy. Patients clinically diagnosed as having a peritonsillar abscess can be subjected to an ultrasound examination which is quick and takes a few minutes to perform. Demonstration of an abscess cavity will assist the clinician in performing a single properly directed aspiration, thus reducing the discomfort to the patient. When no abscess is demonstrated, diagnostic aspiration is unnecessary. Unless severe dysphagia necessitates admission for intravenous fluid replacement, patients can then be discharged home on antibiotics.

Our findings suggest that ultrasound scan should routinely be performed in cases of quinsy. It would also appear to be cost-effective as unnecessary admission can be avoided, and this should be looked into in future studies.

References

- Bonding, P. (1976) Routine abscess tonsillectomy. *Laryngoscope* **86**: 286–290.
- Boesen, T., Jensen, F. (1992) Preoperative ultrasonographic verification of peritonsillar abscesses in patients with severe tonsillitis. *European Archives of Otorhinolaryngology* **249**: 131–133.
- Cachin, Y. (1979) Disease of oropharynx. In *Clinical Otolaryngology*. (Maran, A. D., Stell, P. M., eds.), Blackwell Scientific Publications, Oxford, pp 328–339.
- Chowdhury, C. R., Bricknell, M. C. M. (1992) The management of quinsy—a prospective study. *Journal of Laryngology and Otology* **106**: 986–988.
- Haeggstrom, A., Gustafsson, O., Engquist, S., Engstrom, C. F. (1993) Intraoral ultrasonography in the diagnosis of peritonsillar abscess. *Otolaryngology—Head and Neck Surgery* **108**: 243–247.
- Herzon, F. S. (1984) Perimucosal needle drainage of peritonsillar abscess — a five-year experience. *Archives of Otolaryngology* **110**: 104–105.
- Maharaj, D., Rajah, V., Hemsley, S. (1991) Management of peritonsillar abscess. *Journal of Laryngology and Otology* **105**: 743–745.
- Mosges, R., Kuth, G., Klimek, L., Wein, B., Kurzeja, A., Schlondorff, G. (1990) Peritonsillarabscess im Ultraschallbild. *Laryngology, Rhinology and Otology* **69**: 657–659.
- Ophir, D., Bawnik, J., Poriay, Y., Porat, M., Marshak, G. (1988) Peritonsillar abscess. A prospective evaluation of outpatient management by needle aspiration. *Archives of Otolaryngology, Head and Neck Surgery* **114**: 661–663.
- Patel, K. S., Ahmad, S., O'Leary, G., Michel, M. (1992) The role of computed tomography in the management of peritonsillar abscess. *Otolaryngology—Head and Neck Surgery* **107**: 727–732.
- Ross, F. (1980) Ultrasound. (1) Principles: general; cardiac. In *A Textbook of Radiology and Imaging*. 3rd Edition. (Sutton, D., ed.), Churchill-Livingstone, London, pp 1339–1369.
- Stringer, S. P., Schaefer, S. D., Close, L. G. (1988) A randomized trial for outpatient management of peritonsillar abscess. *Archives of Otolaryngology, Head and Neck Surgery* **114**: 296–298.
- Templer, J. W., Holinger, L. D., Wood, R. D., Tra, N. T., De Blanc, G. B. (1977) Immediate tonsillectomy for the treatment of peritonsillar abscess. *American Journal of Surgery* **134**: 596–598.

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