

SONOGRAPHIC STUDY OF OVARIES IN INFERTILITY

SUDHA PRAKASH • N.K. SARIN • D.S. DHIMAN • N.K. KAUSHIK • RITU SARIN

SUMMARY

Fifty infertile females having normal male partners were selected at random for ultrasound examination of ovaries. Out of these, ovaries were visualised in 37 patients. 12 patients were found to have various ovarian abnormalities: polycystic ovarian disease in 5, endometriosis in 2, ovarian cyst in 2 and dermoid in 1 case. Nonspecific enlargement of ovaries was found in 2 cases. 11 out of these 12 cases had laparoscopic/laparotomy verification and findings were concordant with ultrasound (US) examination findings in 10(91%) cases. US estimation of ovarian size was superior to physical examination and equal to that of laparoscopy. The dynamic morphology of ovary can now be studied by a fast and reliable technique.

Introduction

Anovulation is incompatible with reproduction. Disorders of ovulation account for 15-25% of infertility cases (Geisthovel et al. 1983). Ovarian function may be partly or totally deranged in dysgenesis, infections, tumours and endometriosis of ovaries. Polycystic ovarian disease (PCOD) also results in chronic anovulation manifesting as menstrual irregularities and infertility. Ultrasound (US) examination has become a well established technique for imaging ovaries since the original report by Kratochwil et al in 1972. Further, follicular development and rup-

ture during ovarian cycle are observed more clearly with real-time sector scanners than any other physical or biochemical technique currently available (Hackeloer et al. 1979).

Material and Methods

Fifty females out of the infertile couples were selected at random for ultrasound examination of ovaries during the year 1987-89. Examination was performed on RT 3000 IGE India Ltd. Ultrasound Unit, using 3.5 MHz linear and sector transducers, with full bladder technique.

Wherever possible, endometrial biopsy and laparoscopy/laparotomy were performed. The ultrasound diagnosis was correlated with the clinical findings, endometrial biopsy report and the operative findings.

Department of Radiology and Department of Obstetrics & Gynaecology, Indira Gandhi Medical College, Shimla

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Observations

The age of the females ranged between 19-35 years with the mean age of 25.5 years. The duration of infertility varied from 1-20 years, however 31(62%) cases presented between 1-4 years of infertility. 37(74%) cases were of primary and 13(26%) of secondary infertility.

Clinical Profile : Out of the 50 cases, 14 were having menstrual irregularities; secondary amenorrhoea in 3 cases and oligomenorrhoea in 11 cases. Hirsutism was observed in 1 case and obesity in 3 cases. Physical examination revealed adnexal masses in 4 cases.

Ultrasonic Findings : On ultrasound examination ovaries could not be visualised in 13 cases. Out of the remaining 37 cases, ovaries were displayed on both sides in 32 cases whereas in 5 cases ovaries could be visualised on one side i.e. on right side in 2 cases and on left side in 3 cases.

25 cases (21 out of the group of 32 and 4 out of 5) were reported to have normal ovaries. The volume of normal ovaries ranged between 2.5-8.4 cm³ with mean value of 5.25 cm³ on right side and 2.2 - 8.3 cm³ with mean volume 5.39 cm³ on left side.

12 cases were reported to have ovarian abnormalities; out of them ovaries were bilaterally enlarged in 6 cases, unilaterally enlarged in 4 cases and normal sized in 2 cases. Various ultrasound diagnosis put forward in these cases were: polycystic ovarian disease in 5 cases, endometriosis in 2 cases, ovarian cyst in 2 cases and dermoid in 1 case. Non-specific enlargement of ovaries was reported in 2 cases as no diagnosis could be put forward.

In cases of polycystic ovarian disease ovaries were bilaterally enlarged in 2 cases,

unilaterally enlarged in 1 case and normal sized in 2 cases. Multiple cysts were observed in ovaries in 1 case (Fig.1) whereas in rest of the 4 cases ovaries were isoechoic to uterus (Fig.2). The capsule was thick in 3 of these 4 cases. The volume of the enlarged ovaries ranged from 11.28-21.96 cm³ with mean volume 14.57 cm³.

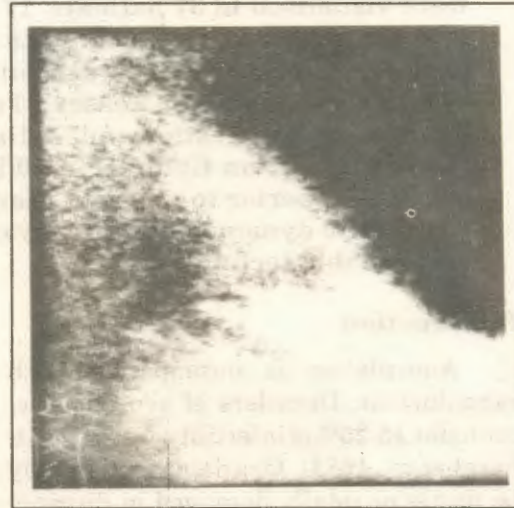


Fig. 1: Magnified view of ovary showing multiple cysts in a case of polycystic ovarian disease.



Fig. 2: Showing solid (isoechoic) ovaries with thickened capsule in polycystic ovarian disease

Sharply marginated transonic lesions favoured the diagnosis of simple ovarian cyst in 2 cases whereas in 1 case transonic lesion, in right ovarian area, with thick echogenic walls was diagnosed as cystic endometriosis (Fig.3). In another case, a well defined mass, in right ovarian area, having uniformly dispersed low-level echoes with good through transmission favoured the diagnosis of solid endometriosis (Fig.4).

A mass of mixed echogenicity having acoustic shadowing behind the echogenic focus was observed in 1 case and was thought to be dermoid.

Laparoscopy/Laparotomy was performed in 11 out of the 12 cases having abnormalities. The findings were: bilateral enlarged cystic ovaries in 3 cases, unilateral enlarged ovary in 1 case, endometriosis in 3 cases, ovarian cyst in 1 case, dermoid in 1 case and normal sized ovaries in 2 cases. 12th case which had non-specific enlargement of ovaries on US

was not available for surgical exploration.

Discussion

Polycystic ovaries were originally associated with a clinical syndrome characterised by hirsutism, menstrual irregularities and infertility (Stein and Leventhal, 1935). Hann et al (1984) observed 71 per cent cases of PCOD to have enlarged ovaries with mean volume of 14 cm^3 . Tabbakh et al (1986) studied 20 cases of PCOD and found ovaries to be enlarged in 75% and normal sized in 25% cases, the volume of enlarged ovaries being $15.46 \pm 2.5 \text{ cm}^3$. We observed 60% cases of PCOD to have enlarged ovaries having volume $11.28 - 21.96 \text{ cm}^3$, the mean being 14.57 cm^3 . Three ultrasonic patterns were observed in PCOD by Tabbakh et al (1986). These were: isoechoic with no discernible cyst, hypoechoic with multiple cysts of $<1 \text{ cm}$. and hypoechoic with single cyst of $>1 \text{ cm}$. Capsule was found to be thick in 90% cases. In the present study isoechoic ovaries with no discernible cyst were observed

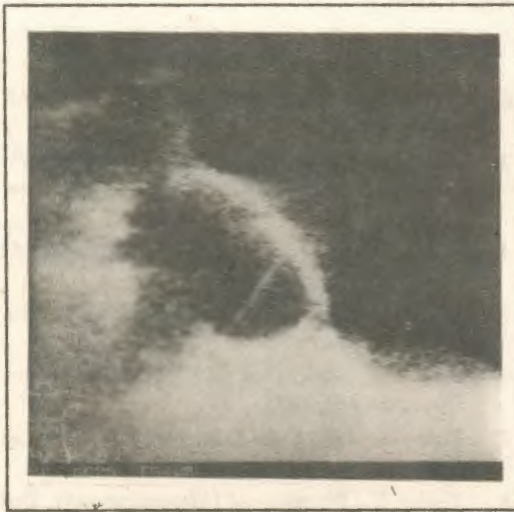


Fig. 3: Magnified view of right ovarian area showing cystic type of endometriosis. Transonic lesion is seen with thick echogenic walls.



Fig. 4: Well defined mass in right ovarian area, showing uniformly dispersed low-level echoes — Solid Type Endometriosis

in 4 cases and hypoechoic with multiple small cyst in 1 case. Capsule was thick in 3(60%) cases.

Diagnosis of endometriosis was made in 2 cases in the present study. Cystic lesion with the thick echogenic walls was characteristic of cystic endometriosis which could be easily differentiated from simple ovarian cysts having sharp margins. Solid endometrioma was visualised as well defined mass having uniformly dispersed low-level echoes with good through transmission. The mass could be appreciated distinctly separate from uterus on ultrasound whereas the clinical suspicion was fibroid uterus. The findings in endometriosis in the present study were the same as observed by Coleman et al (1979) and Walsh et al (1979).

A combination of highly reflective mass on sonography and cystic mass on pelvic examination is highly suggestive of dermoid (Taylor 1985). The present study has also shown that dermoid can be diagnosed if there is an acoustic shadowing in the texture of ovarian cyst, in correlation with the clinical finding of cyst.

Eleven out of 12 cases of ovarian abnormalities had menstrual irregularities. Endometrial biopsy report available in 10 cases indicated ovarian insufficiency. Out of the 11 cases who underwent Laparoscopy/Laparotomy, the findings were concordant with US findings in 10 cases whereas in remaining 1 case, where US finding was nonspecific enlargement of ovaries, laparoscopy revealed endometriosis. Thus the sensitivity of US was 100% and specificity 91%.

4 cases were put on ovulation induction with clomiphene. 2 of them started regular period whereas 1 case had irregu-

lar frequent periods and was suspected to have hyperstimulation on repeat ultrasound after 2 months, so clomiphene was stopped. This patient conceived after 5 months. 4th case did not have any response to clomiphene.

Ultrasonic estimation of ovarian size is superior to physical examination and equal to that of laparoscopy as observed in the present study (only 4 out of 10 cases having ovarian enlargement were found to have mass on physical examination). The only other test that can reliably detect ovaries is laparoscopy, an invasive technique which cannot be used to screen all the females for ovarian abnormalities. Moreover, these patients when put on ovulation induction, US being noninvasive makes repeat scans possible to assess the response to therapy.

US scanning will play an ever increasing role in imaging of ovaries and may be able to replace some of the expensive biochemical tests.

References

1. Coleman B.G., Arger P.H., Mulhern C.B. Jr.: *Am. J. Roentgenol.* 132:747, 1979.
2. Geisthovel F., Skubsch U., Zabel G. et al.: *Fertil. Steril.* 39:277, 1983.
3. Hackeloer B.J., Fleming R., Robinson H.P., Adam A.H. and Coultts J.R.T.: *Obstet. Gynec.* 135:122, 1979.
4. Hann L.E., Hall D.A., McArdle C.R., Seibel M.: *Radiology* 150:531, 1984.
5. Kratochwil A., Urban Y., Friedrich F.: *Ann. Chir. Gynec. Fem.* 61:211, 1972.
6. Stein I.F., Leventhal M.L.: *Am. J. Obstet. Gynec.* 29:181, 1935.
7. Tabbakh G.H., Loftly I., Azab I. et al.: *Am. J. Obstet. Gynec.* 154:892, 1986.
8. Taylor K.J.W.: *Atlas of Ultrasonography*, 2nd Edition. Churchill, Livingstone, Edinburgh, 1985.
9. Walsh J.W., Taylor K.J.W. and Rosenfield A.T.: *Roentgenol* 132:87, 1979.