

CARBON DIOXIDE VERSUS 50% DEXTROSE FOR UTERINE DISTENSION AT HYSTEROSCOPY

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SUMMARY

Many liquid and gaseous media for hysteroscopy though effective have practical drawbacks. A study of 182 hysteroscopies was undertaken to evaluate the efficacy of using 50% dextrose by comparing it with carbon dioxide. Hypertonic dextrose compared well in performance, with impaired vision being reported in 12.7% (7.8% with carbon dioxide). 50% dextrose proves itself a valid, easily available and cheap alternative medium that is safe, easy to use and with advantages for hysteroscopic surgery.

INTRODUCTION :

The walls of the uterine cavity are apposed in vivo with a central virtual cavity (*Hamou and Lewis 1989). The difficulty in maintaining a clear field of distension for successful hysteroscopy in the muscular and vascular uterine cavity thus poses significant challenges. Fortunately with recent developments, a range of distension media are now available for clinical use.

Carbon dioxide permits excellent visualization while keeping the field clean, but CO₂ insufflation is only permitted from a correctly designed and a regularly calibrated instrument (Lewis 1988). This instrument the hysteroflator (Storz) is expensive and not easily accessible to most gynaecologists. The liquid distension me-

dia include dextrose 5% in water, perhaps the simplest and safest of all media and high molecular weight 32% dextran 70 in dextrose (Hyskon), an optically clear biodegradable fluid that is nonmiscible with blood (Valle and Sciarra 1979). While bleeding and debris tend to obscure vision with dextrose 5% in water, Hyskon is expensive and not available for clinical use in India.

Khandwala (1988) recently reported the use of 50% dextrose as a new distension medium. While 50% dextrose maintains a clear field by a high refractive index and poor miscibility with blood, being a physiological metabolite. There is no risk of the rare anaphylactic reactions reported with Hyskon. Hypertonic dextrose is also easily available and economical (100 ml for Rs. 12) and requires no sophisticated instrumentation for distension, though there remains a potential risk of infection. Since there are practical difficulties in the use and availability of the media mentioned earlier, 50% dextrose may

prove a useful medium in our clinical practice.

A recent comparative study reported a disturbing tendency to overdiagnose polyps and adhesions with a liquid medium (Hyskon) as compared to carbon dioxide (Taylor et al 1987). The aim of this study is to evaluate the efficacy and safety of using 50% dextrose by a comparison to standard medium carbon dioxide and also to study the possibility of overdiagnosis of intra-uterine abnormalities by liquid distension media.

MATERIAL AND METHODS :

One hundred and eighty two hysteroscopies were performed at the Wadia hospital for the indications of infertility (110) and menometrorrhagia (72). This being a comparative study, the cases were evaluated in two groups, using carbon dioxide (103) and 50% dextrose (79) as distension media, both groups being comparable for patient characteristics, indications and timing of procedures. All hysteroscopic findings were prospectively recorded.

A 4mm degree foreoblique panoramic hysteroscope (Storz) was used with a 5 mm diagnostic sheath or a 7 mm operative sheath.

Under general anaesthesia or intravenous sedation with a paracervical block was used.

A hysteroinflator (Storz) an electronically controlled delivery system was used for uterine distension with carbon dioxide. Uterine disten-

sion with 50% dextrose was achieved by using a 20 or 50 cc syringe, connected to the hysteroscope through a three-way connection and a length of IV set tubing. The volume of 50% dextrose used was 40 to 60 ml. Prophylactic antibiotics were used in every case. The statistical significance of the findings between the two groups was assessed by applying the chi-square test.

RESULTS AND ANALYSIS :

1. Comparative evaluation of abnormal hysteroscopic findings :

The incidence of abnormal hysteroscopic findings with 50% dextrose in infertility (40%) and menometrorrhagia (58.6%) were comparable, though somewhat more frequent than with carbon dioxide (35% and 48.8% respectively). However the difference as shown in Table I did not prove to be statistically significant.

2. Detailed analysis of abnormal hysteroscopic findings in infertility :

Positive hysteroscopic findings of intrauterine adhesions, endometrial polyps, submucous fibroids and uterine septae were diagnosed in both groups with comparable frequency as seen in Table II. There was a tendency to overdiagnose endometrial hypertrophy with 50% dextrose (22%) as compared to carbon dioxide (10%), the difference being statistically significant.

TABLE - I

Indications and abnormal hysteroscopic findings

Indications (No)	Carbon dioxide			50% Dextrose		
	No.	(Total)	Percent	No.	(Total)	Percent
Infertility (110)	21	(60)	35.0	20	(50)	40.0
Meno-metrorrhagia (72)	21	(43)	48.8	17	(29)	58.6
Total (182)	42	(103)	40.8	37	(79)	46.8

TABLE - II
Abnormal hysteroscopic findings in infertility

Abnormality	Carbon dioxide		50% Dexrose	
	No.	Percent	No.	Percent
Adhesions	12	20.0	12	24.0
Endometrial hypertrophy	6	10.0	11	22.0
	p < 0.05, significant			
Endometrial polyps	3	5.0	10	20.0
Subseptate uteri	4	6.7	5	10.0
Fibromyomas	1	1.7	2	4.0
Total	26	43.3	29	58.0
Corrected Total (Excluding endometrial hypertrophy)	21	35.0	20	40.0
	p > 0.5, not significant			

The total incidence of intrauterine abnormalities with carbon dioxide (43.3%) and 50% dextrose (58%) showed a marked disparity. The corrected overall incidence reached by the exclusion of endometrial hypertrophy, of 35% and 40% respectively were however comparable, thus cautioning against the overdiagnosis of hypertrophy with liquid distension media.

tions with either medium, impaired vision due to bubbles, bleeding or intrauterine debris was reported in 7.8% cases with carbon dioxide and 12.7% cases with 50% dextrose. As seen in Table III the difference was not statistically significant.

Two cases of meno-metrorrhagia where hysteroscopy was performed in the presence of bleeding were declared failed procedures due to total impairment of the visual field.

3. Comparative evaluation of difficulties with distension media
While there were no significant complica-

4. Evaluation of the safety of 50% dextrose
The intraoperative and four hours post-

TABLE - III
Evaluation of distension media

Indications	Carbon dioxide		50% Dexrose	
	No.	Percent	No.	Percent
Impaired vision				
Infertility	5	8.3	4	8.0
Meno-metrorrhagia	3	7.0	6 *	20.7
Total	8	7.8	10	12.7
	p > 0.1, not significant			

* Two failed procedures

tive blood sugar levels were all below 100 mg.%, evidence that hyperglycaemia is not a significant problem.

Cervical swabs were taken for culture on the second postoperative day and were all negative for bacterial growth. No clinical evidence of pelvic infections were recorded in our series of 79 cases using 50% dextrose.

Laparoscopy occasionally revealed small collections of medium in the posterior pouch that were aspirated whenever possible.

DISCUSSION :

A variety of liquid and gaseous media have proven clinically effective for uterine distension, though many also have practical drawbacks (Valle and Sciarra 1979, Hamou and Lewis 1989). For the clinical practice of hysteroscopy in India, carbon dioxide and the hysteroinflator prove expensive, Hyskon is not available for use and dextrose 5% in water does not allow a clear visual field to be maintained for an adequate length of time.

The use of 50% dextrose for distension was first reported by Khandwala (1988). The study concluded that the readily available and inexpensive hypertonic dextrose was a simple, safe and adequate medium for uterine distension with performance comparable to Hyskon. Estimation of blood sugar showed transient hyperglycaemia only when over 200 ml of the medium was used.

Our study confirms these findings. 50% dextrose compared well with carbon dioxide when performance was evaluated. While panoramic vision was superior with carbon dioxide, endometrial details were better appreciated with 50% dextrose. Hypertonic dextrose maintained a clearer field of vision in the presence of active bleeding by its viscosity.

No significant complications were recorded with either medium. We did not encounter hyperglycaemia in our series, probably because the total volume of medium used was less than 60 ml in all cases. In our series hysteroscopic adhesiolysis and septectomy were satisfactorily

performed in a number of cases using a miniature scissors with both the media under evaluation.

While the effectiveness of 50% dextrose stands established, a recent report (Taylor et al 1987) showed a decrease in the incidence of positive intrauterine findings in infertility from 35.7% with Hyskon to just 11.2% with carbon dioxide, with a tendency to overdiagnose endometrial hypertrophy and polyps. With 50% dextrose however the overall incidence of abnormal findings in both infertility and menometrorrhagia was not significantly different between liquid and gaseous media. Our impression is that since liquid media tend to highlight details of endometrial architecture, floating tufts of normal endometrium may be reported as hyperplastic or polypoid.

This study is testimony to the effectiveness of 50% dextrose for uterine distension. The medium besides being physiological and the most inexpensive is found to be safe, easy to use and with specific advantages for most operative hysteroscopic procedures.

Difficulties in availability of media or other drawbacks can no longer be reasons for not incorporating hysteroscopy in routine gynaecological practice, since 50% dextrose has proven itself valid alternative medium easily available for day to day clinical use.

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